

THE IRON AGE

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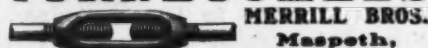
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THE IRON AGE

New York, Thursday, December 10, 1908.

The Present Status of Military Aëronautics.—II*

BY MAJOR GEORGE O. SQUIER, U. S. A.

AVIATION.

This division comprises all those forms of heavier than air flying machines which depend for their support upon the dynamic reaction of the atmosphere. There are several subdivisions of this class dependent upon the particular principle of operation. Among these may be mentioned the aëroplane, orthopter, helicopter, &c. The only one of these that has been sufficiently developed at present to carry a man in practical flight is the aëroplane. There have been a large number of types of aëroplanes tested with more or less success and of these the following are selected for illustration.

Representative Aëroplanes of Various Types.

The Wright Brothers' Aëroplane.

The general conditions under which the Wright machine was built for the Government were, that it should develop a speed of at least 36 miles per hour, and in its trial flights remain continuously in the air for at least 1 hr. It was designed to carry two persons having a com-

the mechanism controlling the warping of the main surfaces, are operated by three levers. The motor, which was designed by the Wright brothers, has four cylinders and is water cooled. It develops about 25 hp. at 1400 rev. per min. There are two wooden propellers 8½ ft. diameter which are designed to run at about 400 rev. per min. The machine is supported on two runners and weighs about 800 lb. A monorail is used in starting.

The Wright machine has attained an estimated maximum speed of about 40 miles per hour. On September 12, a few days before the accident which wrecked the machine, a record flight of 1 hr. 14 min. 20 sec. was made at Fort Myer, Virginia. Since that date Wilbur Wright, at Le Mans, France, has made better records; on one occasion remaining in the air for more than an hour and a half with a passenger. The illustrations show its details, its method of starting and its appearance in flight.

The Herring Aëroplane.

The Signal Corps of the Army has contracted with A. M. Herring of New York to furnish an aëroplane un-

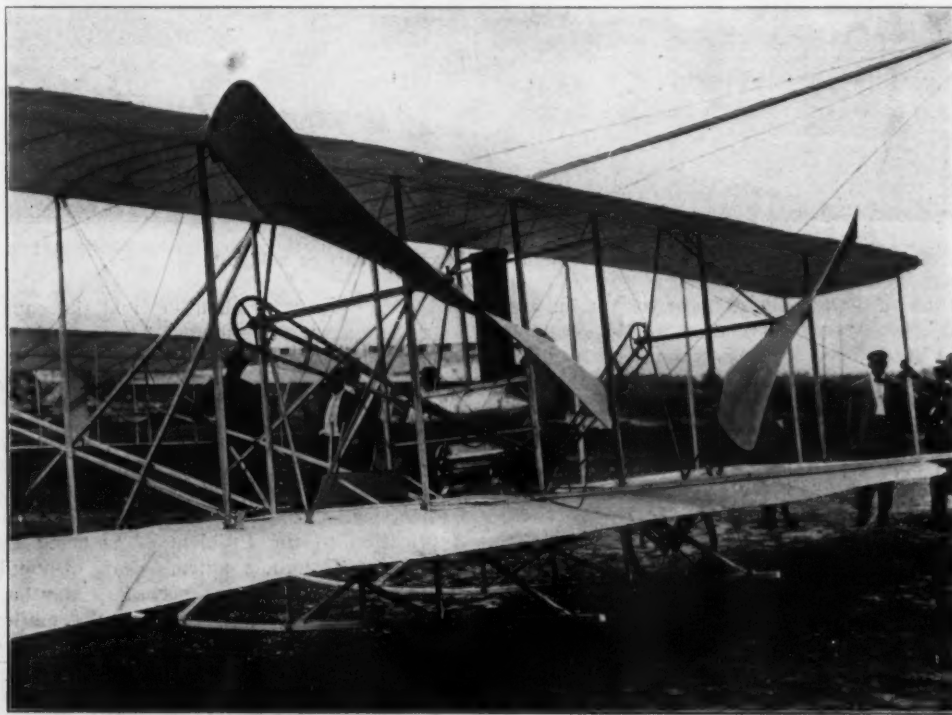


Fig. 8.—A Detail of the Wright Aëroplane as Viewed from the Rear.

bined weight of 350 lb. and also sufficient fuel for a flight of 125 miles. The trials at Fort Myer, Va., in September, 1908, indicated that the machine was able to fulfill the requirements of the Government specifications.

The aëroplane has two superposed main surfaces 6 ft. apart with a spread of 40 ft. and a distance of 6½ ft. from front to rear. The area of this double supporting surface is about 500 sq. ft. The surfaces are so constructed that their extremities may be warped at the will of the operator. A horizontal rudder of two superposed plane surfaces about 15 ft. long and 3 ft. wide is placed in front of the main surfaces. Behind the main planes is a vertical rudder formed of two surfaces trussed together about 5½ ft. long and 1 ft. wide. The auxiliary surfaces, and

der the conditions enumerated in the specification already referred to. Mr. Herring made technical delivery of his machine at the aëronautical testing ground at Fort Myer, Virginia, on October 13. In compliance with the request of Mr. Herring the details of this machine will not be made public at present, but the official tests required under the contract will be conducted in public as has been the case with other aëronautical devices. Opportunity will be afforded any one to observe the machine in operation. This machine embodies new features for automatic control and contains an engine of remarkable lightness per horsepower.

The Farman Aëroplane.

The Farman flying machine has two superposed aërosurfaces 4 ft. 11 in. apart with a spread of 42 ft. 9 in. and 6 ft. 7 in. from front to rear. The total sustaining

* From a paper presented December 2, 1908, at the New York meeting of the American Society of Mechanical Engineers.

surface is about 560 sq. ft. A box tail 6 ft. 7 in. wide and 9 ft. 10 in. long in rear of the main surfaces is used to balance the machine. The vertical sides of the tail are pivoted along the front edges, and serve as a vertical rudder for steering in a horizontal plane. There are two parallel, vertical partitions near the middle of the main supporting surfaces, and one vertical partition in the middle of the box tail. A horizontal rudder in front of the machine is used to elevate or depress it in flight.

The motor is an eight cylinder Antoinette of 50 hp. weighing 176 lb., and developing about 38 hp. at 1050 rev. per min. The propeller is a built-up steel frame covered with aluminum sheeting, $7\frac{1}{2}$ ft. in diameter, with a pitch of 4 ft. 7 in. It is mounted directly on the motor shaft immediately in rear of the middle of the main surfaces. The framework is of wood, covered with canvas. A chassis steel tubing carries two pneumatic-tired bicycle wheels. Two smaller wheels are placed under the tail. The total weight of the machine is 1166 lb. The main surfaces support a little over 2 lb. per square foot. The machine has shown a speed of about 28 miles per hour, and no starting apparatus is used.

On January 13, 1908, Farman won the Grand Prix

the *Scientific American* trophy by covering the distance of over a mile in 1 min. and 42 2-5 sec. at a speed of about 39 miles per hour.

HYDROMECHANIC RELATIONS.

Some General Relations Between Ships in Air and Water.

At present so many are engaged upon the general problem of aerial navigation that any method by which a broad forecast of the subject can be made is particularly desirable. Each branch of the subject has its advocates, each believing implicitly in the superiority of his method. The adherents of the dirigible balloon have little confidence in the future of the aeroplane, while another class have no energy to devote to the dirigible balloon, and still others prefer to work on the pure helicopter principle. As a matter of fact, each of these types is probably of permanent importance, and each particularly adapted to certain needs. Fortunately for the development of each type, the experiments made with one class are of value to the other classes, and those in turn bear close analogy to the types of boats used in marine navigation. The dynamical properties of water



Fig. 9.—The Wright Aëroplane Ready to Start on a Flight.

of the Aëro Club of France in a flight of 1 min. and 28 sec., in which he covered more than a kilometer. It is reported that on October 30, 1908, a flight of 20 miles, from Mourmelon to Rheims, was made with this machine.

The Bleriot Aëroplane.

Following Farman's first flight from town to town, M. Bleriot with his monoplane aëroplane made a flight from Toury to the neighborhood of Artenay and back, a total distance of about 28 kilometers. He landed twice during these flights and covered 14 kilometers of his journey in about 10 min., or attained a speed of 52 miles an hour.

The June Bug.

The June Bug was designed by the Aërial Experiment Association, of which Alexander Graham Bell is president. It has two main superposed aërosurfaces with a spread of 42 ft. 6 in., including wing tips, with a total supporting surface of 370 sq. ft. The tail is of the box type. The vertical rudder above the rear edge of the tail is 30 in. square. The horizontal rudder in front of the main surfaces is 30 in. wide by 8 ft. long. There are four triangular wing tips pivoted along their front edges for maintaining transverse equilibrium. The vertical rudder is operated by a steering wheel, and the movable tips by cords attached to the body of the aviator. The motor is a 25-hp. eight cylinder air cooled Curtiss engine. The single wooden propeller immediately behind the main surfaces is 6 ft. 2 in. diameter and mounted directly on the motor shaft. It has a pitch angle of about 17 degrees, and is designed to run at about 1200 rev. per min. The total weight of the machine, with aviator, is 650 lb. It has a load of about $1\frac{1}{4}$ lb. per square foot of supporting surface. Two pneumatic-tired bicycle wheels are attached to the lower part of the frame.

With this machine G. H. Curtiss, on July 4, 1908, won

and air are very much alike, and the equations of motion are similar for the two fluids, so that the data obtained from experiments in water, which are very extensive, may with slight modifications be applied to computations for aerial navigation.

Von Helmholtz, a physicist of Germany, has fortunately considered this subject, in a paper written in 1873, "On a Theorem Relative to Movements That Are Geometrically Similar in Fluid Bodies, Together with an Application to the Problem of Steering Balloons." In this paper Helmholtz affirms that, although the differential equations of hydro-mechanics may be an exact expression of the laws controlling the motions of fluids, still it is only for relatively few and simple experimental cases that we can obtain integrals appropriate to the given conditions, particularly if the cases involve viscosity and surfaces of discontinuity. Hence, in dealing practically with the motion of fluids, we must depend upon experiment almost entirely, often being able to predict very little from theory, and that usually with uncertainty. Without integrating, however, he applies the hydrodynamic equations to transfer the observations made on any one fluid with given models and speeds, over to a geometrically similar mass of another fluid involving other speeds, and models of different magnitudes. By this means he is able to compute the size, velocity, resistance power, &c., of aerial craft from given, or observed, values for marine craft. He also deduces laws that must inevitably place a limit upon the possible size and velocity of aerial craft without, however, indicating what that limit may be with artificial power. Applying this mode of reasoning to large birds, he concludes by saying that, "It therefore appears probable that in the model of the great vulture nature has already reached the limit that can be attained with the muscles as work-

ing organs, and under the most favorable conditions of subsistence, for the magnitude of a creature that shall raise itself by its wings and remain a long time in the air. In comparing the behavior of models in water and air, he takes account of the density and viscosity of the media, as these were well known at the date of his writing, 1873; but he could not take account of the sliding, or skin friction, because in his day neither the magnitude of such friction for air, nor the law of its variation with velocity had been determined.

Skin-Friction in Air.

Even as late as Langley's experiments, skin friction in air was regarded as a negligible quantity, but due to the

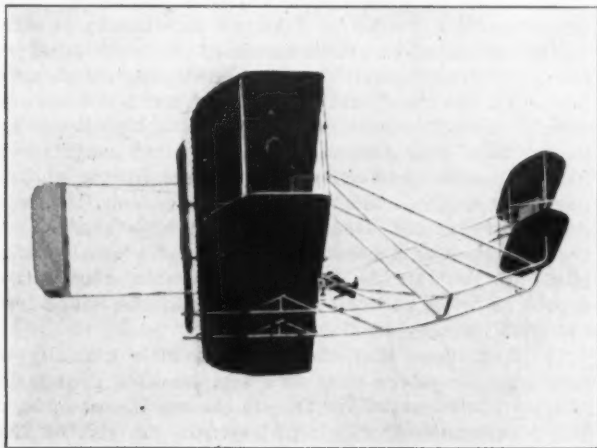


Fig. 10.—The Wright Aéroplane in Flight.

work of Dr. Zahn who was the first to make any really extensive and reliable experiments on skin friction in air, we now can estimate the magnitude of this quantity. His research shows that "the frictional resistance is at least as great for air as water, in proportion to their densities. In other words, it amounts to a decided obstacle in high speed transportation. In aëronautics it is one of the chief elements of resistance both to hull shaped bodies and to aëro-surfaces gliding at small angles of flight."

Peter Cooper-Hewitt has given careful study to the relative behavior of ships in air and in water. He has made a special study of hydroplanes, and has prepared graphic representations of his results which furnish a valuable forecast of the problem of flight. Without knowing of Helmholtz's theorem, Cooper-Hewitt has independently computed curves for ships and hydroplanes from actual data in water, and has employed these curves to solve analogous problems in air, using the relative densities of the two media, approximately 800 to 1, to determine the relative values of support by dynamic reaction and by displacement for various weights and speeds.

An analysis of these curves leads to conclusions of importance, some of which are as follows:

The power consumed in propelling a displacement vessel at any constant speed, supported by air or water, is considered as being two-thirds consumed by skin resistance, or surface resistance, and one-third consumed by head resistance. Such a vessel will be about 10 diameters in length, or should be of such shape that the sum of the power consumed in surface friction and in head resistance will be a minimum (torpedo shape). The power required to overcome friction due to forward movement will be about one-eighth as much for a vessel in air as for a vessel of the same weight in water. Leaving other things out of consideration, higher speeds can be obtained in craft of small tonnage by the dynamic reaction type than by the displacement type, for large tonnages the advantages of the displacement type are manifest. A dirigible balloon carrying the same weight, other things being equal, may be made to travel about twice as fast as a boat for the same power; or be made to travel at the same speed with the expenditure of about one-eighth of the power. As there are practically always currents in the air reaching at times, a velocity of many miles per

hour, a dirigible balloon should be constructed with sufficient power to be able to travel at a speed of about 50 miles per hour, in order that it may be available under practical conditions of weather. In other words, it should have substantially as much power as would drive a boat, carrying the same weight, 25 miles an hour, or should have the same ratio of power to size as the Lusitania.

It is the general opinion that any one of several types of internal combustion motors at present available is suitable for use with dirigible balloons. With this type lightness need not be obtained at the sacrifice of efficiency. In the aëroplane, however, lightness per output is a prime consideration, and certainty and reliability of action is demanded, since if by chance the motor stops, the machine must immediately glide to the earth.

The fundamental principles of propellers are the same for air as for water. In both elements, the thrust is directly proportional to the mass of fluid set in motion per second. A great variety of types of propellers have been devised, but, thus far only the screw propeller has proved to be of practical value in air. The theory of the screw propeller in air is substantially the same as for the deeply submerged screw propeller in water.

It appears that both fundamental forms of aërial craft will likely be developed, and that the lighter than air type will be the burden bearing machine, whereas the heavier than air type will be limited to comparatively low tonnage, operating at relatively high velocity. The helicopter type of machine may be considered as the limit of the aëroplane, when by constantly increasing the speed, the area of the supporting surfaces is continuously reduced until it practically disappears. We may then picture a racing aëroplane propelled by great power, supported largely by the pressure against its body, and with its wings reduced to mere fins which serve to guide and steady its motion. In other words, starting with the aëroplane type; we have the dirigible balloon on the one hand as the tonnage increases, and the helicopter type on the other extreme as the speed increases. Apparently, therefore, no one of these forms will be exclusively used, but each will have its place for the particular work required.

AËRIAL LOCOMOTION IN WARFARE.

Whatever may be the influence of aërial navigation upon the art of war, the fact which must be considered at present is, that each of the principal military powers is

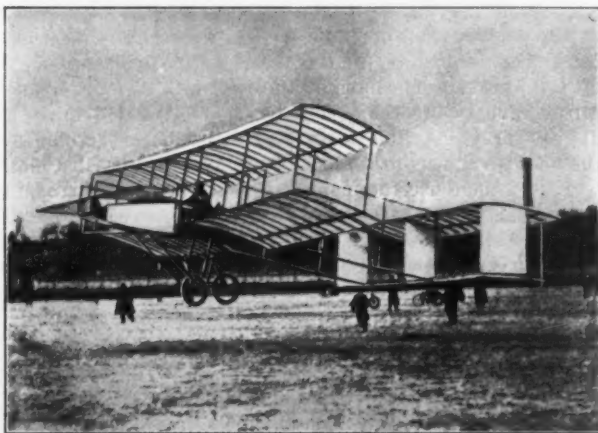


Fig. 11.—The Farman Aéroplane Leaving the Ground.

displaying activity in developing this auxiliary as an adjunct to the military establishment. If each of the great powers of the world would agree that aërial warfare should not be carried on, the subject would be of no great interest to this country as far as our military policy is concerned, but until such an agreement is made this country is forced to an immediate and serious consideration of this subject in order to be prepared for any eventuality. The identical reasoning which has led to the adoption of a policy of providing for increasing our navy year by year to maintain our relative supremacy on the sea, is immediately applicable to the military control of the air. If the policy in respect to the navy is ad-

mitted, there is no escape from the deduction that we should proceed in the development of ships of the air on a scale commensurate with the position of the nation. The question as to whether or not the powers will ultimately permit the use of aerial ships in war is not at present the practical one, because in case such use is authorized it will be too late adequately to equip ourselves after war has been declared.

Action of the Hague Peace Conference.

The following is the declaration signed by the delegates of the United States to the Second International Peace Conference, held at The Hague, June 15 to October 19, 1907, prohibiting the discharge of projectiles and explosives from balloons, ratified March 10, 1908:

"The contracting powers agree to prohibit, for a period extending to the close of the Third Peace Conference, the discharge of projectiles and explosives from balloons or by other new methods of a similar nature."

The delegates of the United States signed this declaration. The countries which did not sign the declaration forbidding the launching of projectiles and explosives from balloons were: Germany, Austria-Hungary, China, Denmark, Ecuador, Spain, France, Great Britain, Guatemala, Italy, Japan, Mexico, Montenegro, Nicaragua, Paraguay, Roumania, Russia, Servia, Sweden, Switzerland, Turkey and Venezuela. It appears that the United States is the only first class power who signed this agreement, and an analysis of the text of the agreement itself shows that no serious attempt was made to settle the question finally. For instance, while the war balloon may not discharge projectiles or explosives from above, yet no reciprocal provision is made preventing such war balloon from being fired upon from the earth below, yet the law of self-defense evidently obtains. Furthermore, naval experts will tell you that they fear no enemy quite as much as a submarine mine, whose location is unknown and which gives no warning when it is approached. Our own experience shows that the battleship *Maine* could be completely destroyed in time of peace without any one detecting the preparations for its accomplishment. If, then, a nation can submerge a mine for the destruction of ships from underneath the water, why can it not drop an aerial mine upon a ship from above? And if it should be allowed to drop an aerial mine upon an enemy's fortified ship at sea, it certainly should be allowed to drop such an aerial mine upon a fortified place on land.

Influence on the Military Art.

The military art up to the present time has been practically conducted in a plane where the armies concerned have been limited in their movements in time and place by the physical character of the terrain. A large army, for instance, cannot move faster than about 12 miles a day by marching, and the use of railroads as applied to the art of war was first recognized in the Franco-Prussian war. By their use the mobilization of the great Prussian army, and its accurate assembling in the theatre of operations within ten days, contributed an initial advantage not before possible. The very essence of strategy is surprise, and there never were better opportunities than at present for a constructive general to achieve great victories. But these victories to be really great must be founded upon some new development or use of power not heretofore known in war. They must also tend to produce results with the minimum loss of human life; the sentiment of the world demands that the military art shall aim to capture, not destroy. It may be said that the consummation of military art is found in maneuvering the enemy into untenable situations, thereby forcing a decisive result with a minimum loss of life and treasure.

As to the technical use of dirigible balloons and aeroplanes in warfare we have nothing but theory at present to guide us. It would appear in the case of dirigible balloons that two different classes should be developed. One a comparatively small dirigible type with a capacity of from 50,000 to 100,000 cu. ft., to be used principally for scouting purposes and to a limited extent for carrying explosives for demolition or for incendiary purposes, such as destroying bridges and supply depots close to the mobile army or coast defense fortress. In reconnoitering, dirigibles of this class, to be safe during daytime will

have to maneuver at an altitude of about a mile, but experiments show that telephotographic apparatus will operate from this height to give much detail. At night, such dirigibles may descend to within a few hundred feet of the ground with safety and thus obtain much valuable information. Equipped with wireless telegraph or telephone apparatus, military data could be obtained and transmitted without undue risk. Due to the small carrying capacity of such sizes, the radius of action would probably be limited at present to about 200 miles.

A second type of dirigible may be developed for burden bearing purposes. The larger the airship the greater the speed it may be given, and the greater its radius of action. There is no reason to doubt that airships of capacity, from 500,000 to 1,000,000 cu. ft. may be ultimately developed to attain speeds of 50 to 75 miles per hour. With a capacity for such speed, the aerial craft becomes a powerful practical engine of war which may be used in all ordinary weather. By keeping high in the air in day time, and descending at night, they may launch high explosives, producing great damage. Being able to pass over armies and proceed at great speeds, their objectives would not usually be the enemy's armies, but their efforts would be directed against his base of supplies; to destroy his dry docks, arsenals, ammunition depots, principal railroad centers, storehouses, and indeed the enemy's navy itself.

It is thought that there will be little difficulty in launching explosives with accuracy, provided good maps and plans are available. Due to the small cost of such ships, as compared with naval vessels, the risk of loss would be readily taken. The element of time has always been a controlling factor in warfare. It is often a military necessity to conduct a reconnaissance in force to develop the enemy's dispositions. This requires at times a detachment of several thousand men from the main army, for a considerable period of time to accomplish this end. With efficient military airships, these results may be attained with a very few men in a small fraction of the time heretofore required.

The realization of aerial navigation for military purposes, brings forward new questions regarding the limitation of frontiers. As long as military operations are confined to the surface of the earth, it has been the custom to protect the geographical limits of a country by ample preparations in time of peace, such as a line of fortresses properly garrisoned. At the outbreak of war these boundaries represent real and definite limits to military operations. Excursions into the enemy's territory usually require the backing of a strong military force. Under the new conditions, however, these geographic boundaries no longer offer the same definite limits to military movements. With a third dimension added to the theater of operations, it will be possible to pass over this boundary on rapid raids for obtaining information, accomplishing demolitions, &c., returning to safe harbors in a minimum time. We may, therefore, regard the advent of military ships of the air as in a measure obliterating present national frontiers in conducting military operations.

One of the military objectives in warfare is usually the enemy's capital city, his ministers, and his chief executive. This objective has heretofore been protected by large armies of soldiers, who, in themselves are not so important to the result. In order to attain the objective it has been frequently necessary to subdue large numbers of soldiers needlessly. With the advent of efficient ships of the air, however, small parties may pass over these protective armies on expeditions aimed at the seat of government itself, where reside the body of particular individuals most responsible, so that the ultimate result will be to deter a rash entrance into war for personal ends; since now for the first time responsible individuals of state may be in immediate and personal danger after the declaration of war, which heretofore has not been usually the case.

Interior Harbors.

In the development of these larger types of dirigible balloons the main difficulty will be in providing suitable harbors or places of safety, for replenishing supplies and

for seeking shelter in times of stress. As long as the dirigible balloon remains in the air it may be regarded as tolerably safe, both in itself and as a conveyance for observers. If its engines are disabled, it is at least a free balloon and may be operated as such. When brought in contact with the ground, however, it is in considerable danger from high winds. The momentum of such an enormous airship is great, and the comparatively fragile structure of the craft makes it an easy prey to the pounding which it is likely to receive when landing. Just as marine ships must seek a sheltered harbor or put to the open sea in times of storm, so with ships of the air it is much more necessary either to brave the storm in the open or to seek some sheltered harbor on land. Fortunately certain suitable harbors for very large ships may be provided at small expense, by using narrows and deep valleys and ravines, surrounded by forests or other protection, or prepared railroad cuts, &c., where the airship may descend and be reasonable safe from the winds above. These harbors should be known to the pilot, and carefully plotted on his maps beforehand. The compass bearings of each harbor from prominent points on land must be known and plotted to assist, as far as possible, in navigating the airship in thick weather; and such harbors may be indicated to the pilot at night by vertical searchlight beams, or by suitable rockets, &c.

The aeroplane, as has been pointed out, is likely to prove a flying machine of comparatively low tonnage and high speed. It is not likely to become a burden bearing ship, at least in single units, but will be extremely useful for reconnoitering purposes, for dispatching important orders and instructions at high speed, for reaching inaccessible points, or for carrying individuals of high rank and command to points where their personality is needed.

One of the bloodiest contests the world has ever seen was the Japanese attack on 203 Meter Hill, yet the sole object of this great slaughter was to place two or three men at its summit to direct the fire of the Japanese siege guns upon the Russian fleet in the harbor at Port Arthur.

If the United States had possessed in 1898 a single dirigible balloon, even of the size of the one now at Fort Meyer, Va., which cost less than \$10,000, the American army and navy would not have long remained in doubt of the presence of Cervera's fleet in Santiago Harbor.

The world is undoubtedly growing more humane year by year. We have arrived at a conception of the principle of an efficient army and navy, not to provoke war, but to preserve peace, and it is believed that, following this principle, the perfection of ships of the air for military purposes will materially contribute on the whole to make war less likely in the future than in the past.

Customs Decisions.

The United States Circuit Court to Pass on German Agreement.

It is not unlikely that Judge Martin of the United States Circuit Court within a short time will pass upon the legality of the construction put upon section 19 of the Customs Administrative act in the commercial agreement between the United States and Germany entered into last year. This section of the law defines what value is to be taken in the assessment of ad valorem duties. Since the enactment of the German agreement the United States Government has extended the concessions made to Germany to practically all other nations having commercial intercourse with this country. It thus happens that while the present case before the court concerns importations from France, the question at issue is identical with a similar issue which might be raised from Germany.

In a case tried before the United States Supreme Court a number of years ago it was held that when goods are sold for domestic consumption in the foreign country at one price and for export to the United States at another price, duty must be based on the home price and not on the export price. Since that decision the Government has been taking duty based on the home market price, regardless of whether the particular articles were

sold for home consumption or not, it being the practice to take the home value of similar goods when none identical in character were sold for home consumption. In the agreement with Germany the United States Government pledged itself not to take the home market price unless when goods of the same character were sold for home consumption in usual wholesale quantities, it being agreed that this was the proper construction of section 19, the decision of the Supreme Court applying only when identical goods were sold in the home markets in usual wholesale quantities.

The question as to whether this is the proper construction is now before Judge Martin in the case of *United States vs. Haviland & Co.*, which was tried before him last week. In this case the Board of General Appraisers found the value of Haviland's goods to be considerably above the entered value. The importers, however, filed a protest against the assessment of duty by the collector on this basis, claiming that the Reappraisal Board's decision was illegal, not only on the ground that there was no evidence before them to support their finding, but also on the ground that under the construction put upon section 19 by the German agreement, the export price must be taken, because Haviland's goods are not sold in the French market in usual wholesale quantities. The Board of Classification of General Appraisers sustained the protest on the first ground, but did not pass upon the second question. The Government appealed to the United States Circuit Court in an attempt to secure a reversal of the protest board's decision. As that board did not base its decision on the construction of section 19, but on the other ground, the German agreement question will probably not be considered by the court unless Judge Martin is of the opinion that the ground of the board's decision was erroneous, in which case he will have to consider the other claim of the importers. When the case came up it was argued by D. Frank Lloyd, assistant district attorney, for the Government, and by B. A. Levett, for the importers. The hearing occupied all day November 17 and the next morning. Judge Martin took the case under advisement and a decision is expected within two or three weeks.

Wire Drawing Plates.

Subboard No. 2 of the United States General Appraisers, consisting of Marion De Vries, William B. Howell and I. F. Fischer, recently heard testimony in a new case brought before the lower customs tribunal to determine the classification of merchandise claimed by the Charles Newman Wire Company to be entitled to enter this country as "steel plates not specially provided for," at the rates according to their value per pound. According to the custom house authorities, the articles should be classified as "steel draw plates or wire drawing plates, including wortles." Under this classification the merchandise was assessed for duty at the rate of 45 per cent. under the appropriate provision in the tariff act. Most of the decisions before the Board of Appraisers, the Circuit Court and the Circuit Court of Appeals went against the importers. Everit Brown, counsel for the importers, made the discovery of error before the Appellate tribunal, and the new trial of the issue before the Board of Appraisers results. At the conclusion of the hearing the board took the papers in the case and withheld decision.

Needles.

The Board of United States General Appraisers has sustained a protest filed by Dieckerhoff, Radloer & Co., New York, it being held that needles imported in cases are not to be regarded for the purposes of duty as "manufactures of metal," at 45 per cent., but instead must be admitted either free of duty or at lower rates. All of the contentions are sustained by the board. The importers made a number of claims, as follows: That the needles are entitled to free entry under paragraph 620; that as to needles or bodkins of metal, which are provided for under paragraph 165, the duty should be as provided therein, and that as to the cases or coverings they should be classified at appropriate rates, according to the component material of chief value.

THE MECHANICAL ENGINEERS' CONVENTION.

Twenty-Ninth Annual Meeting, New York, December 1 to 4, 1908.

The steadily increasing attendance at the annual meetings in New York of the American Society of Mechanical Engineers indicates not alone a growth of the society, but that which is responsible for the growth, the increasing interest which the meetings hold for the profession at large. It was predicted and the prediction verified that this would be the most successful meeting of the society to date. In the selection of papers was evident the more recent policy to include such as will appeal to the largest possible number of the members, and so to group them that those unable to attend the entire meeting could in one session hear the papers they would be especially interested in. At the same time it has been realized that the monthly *Journal* bringing the discussions of the papers to the members earlier than the yearly volume of *Transactions* has still further removed the need of attending the meetings for the sake of the discussions, and the excursion part of the programme has been made more important and attractive. At this meeting no attempt was made to separate the two features, professional sessions and excursions being in progress simultaneously throughout the meeting. Printed programmes of each helped the individual to dispose his time to best advantage. A very thorough preparation was made for an unusually large number of excursions and time was available for one more professional session than before.

Most prominent as features of this meeting were the systematic provision for expediting routine, registration included, of which mention was made last week in the report of the opening night, December 1; the consideration for the first time before a national society of the subject of aerial navigation; a section dealing exclusively with machine shop practice, and the first steps taken to organize a section of the society to deal with such matters. This is in accordance with an amendment to the constitution adopted one year ago to provide for sections within the society to confine themselves to special phases of engineering, of which the gas power section formed at that time was the first.

The Engineering Societies' Building as headquarters and accommodation for all the meetings, collations and the reception again showed its exceptional advantages for the purposes of a convention. By the separating of members from guests in the registration and the registering as guests only those participating in the social features, the professional sessions being open to the public without registration, it was possible to obtain a better idea of how large a representation of the society was actually in attendance. The total registration, 1048, while not so large as that of a year ago, meant more because of that number 738 were members, the largest attendance of members in the history of the society.

SECOND SESSION.

The first professional session convened Wednesday morning in the auditorium and as customary dispensed first with business. The report of tellers on the election of new members announced the acquisition since the last meeting of 191 in all grades, and the report of tellers on the election of officers the following: President, Jesse M. Smith; vice-presidents, George M. Bond, R. C. Carpenter and F. M. Whyte; managers, H. L. Gantt, I. E. Moulthrop and W. J. Sando, and treasurer, William H. Wiley. President-elect Smith was then conducted to the platform and introduced to the society and made a brief response. As the term of office of the new president begins with the close of the annual meeting, President Holman continued in the chair. This was the end of the business part of the meeting, and the first of the papers was next taken up.

The Engineer and the People.

BY MORRIS L. COOKE, PHILADELPHIA, PA.

This paper dealt with an ethical question, the relation of the engineering profession to the public, and was a plea for more consideration for the community at large in the

activities of this profession. In proposing a plan for greater co-operation between the society and the public, the author recommended the appointing of a standing committee to be known as the Committee on Relations with the Public. Among its duties would be providing courses of popular lectures on engineering, and the general dissemination of knowledge that conduces to public welfare; the inviting of the confidence of the people to the end that the society might be freely consulted on questions which it would be capable of giving expert advice upon, and generally to increase the usefulness of the society to the country which involves a broadening of the object of the society as at present laid down.

Written discussion of this paper were read by Honorary Secretary Hutton from President Arthur T. Hadley, Yale University; Talcott Williams, editor of the *Philadelphia Press*, and Frank M. Day, past-president of the American Institute of Architects. President Hadley declared: "I believe that the engineering profession will not reach the highest position of influence which lies open to it until it has appreciated more fully than it now does the line of opportunity indicated therein." Talcott Williams decried the lack of credit given engineers by the world at large for the big works done. The engineer fails to get credit because his profession is not comprehended by the masses. He declared there is no body of men knowing so much which influences public opinion so little and urged that engineering societies exert their influence in accomplishing legislation that the country needs, but upon which only engineers are capable of giving expert advice. Even as medical societies concern themselves with laws effecting the public health, he considered it the duty of the engineer to educate the public in the matters which mean so much to civilization and can come with authority from no one but him. Frank M. Day declared that the professional society owes as much to the public as to its members. This has long been appreciated by the architects, as indicated by instances cited of such work as has been done by the American Institute of Architects. He also discussed the relation of technical, artistic and learned societies to each other, believing they should be closer. Architects and mechanical engineers especially have much in common and to their advantage have been brought into closer touch than formerly. He inquired if the institute and the society cannot be of service to one another. Oral discussions were also offered by F. J. Miller, A. W. Moseley, F. W. Taylor and J. M. Dodge. The latter wondered how the objects of the paper could be carried out, but thought that any difficulties that might arise would adjust themselves. Ambrose Swasey spoke appreciatively of the paper and offered a resolution that the society recommend to the Council the appointing of a professional committee to investigate, consider and report on matters of public concern, this being the style of committee mentioned in the paper. The motion was seconded by F. W. Taylor and C. W. Hunt, and the resolution was adopted.

The next was a paper much looked forward to.

The Present Status of Military Aeronautics.

BY MAJOR GEORGE O. SQUIER, U.S.A.

No abstract of this paper is necessary, as it has been quite completely given in the installment which appeared in last week's issue and the concluding one in this number.

Dr. W. J. Humphreys discussed the importance of studying winds and rainfalls in connection with aerial navigation. Within a short distance from the surface of the earth the direction and velocity of the wind may change greatly. Air near the surface of the earth is turbulent after the manner of a choppy sea. The speaker believed that weather maps will be very important to navigators of the air. Dr. Brashear, who was associated with Langley for three years, paid a tribute to his work in connection with aeroplanes and believed that credit should be given to Langley as a pioneer in such investigations. G. L. Thornton outlined Langley's work, which included experiments with all types of aeroplanes.

THIRD SESSION.

Wednesday afternoon, again in the auditorium, the society assembled for the consideration of a series of papers connected with steam and power plants. The first,

A Method of Obtaining Ratios of Specific Heat of Vapors.

BY A. R. DODGE, SCHENECTADY, N. Y.,

was in a measure a supplement to the paper presented by the author at the Indianapolis meeting, May 28, 1907. In it was given a method of obtaining ratios of specific heat which does not involve the use of available steam tables, which are considered to be too inaccurate for such investigations, nor a condition in which the steam is presumed to be without moisture or superheat. The method is based upon the expansion of initially superheated fluid in a throttling calorimeter, and tables are included giving data for steam.

Dr. H. N. Davis of Harvard University considered Dodge's method of using the throttling calorimeter for measuring superheat of steam very important. He had had the privilege of examining the author's data before the paper was presented in connection with work of his own and together they had discovered inexplicable low temperatures at the low pressure side of the calorimeter, and felt impelled therefore to caution those who may have occasion to use the author's data. There being no further discussion of this paper, the speaker proceeded with the presentation of his own paper on

The Total Heat of Saturated Steam.

BY DR. HARVEY N. DAVIS, CAMBRIDGE, MASS.

It has for some time been suspected that Regnault's formula for the total heat of saturated steam,

$$H = 1091.7 + 0.305(t - 32) \text{ B.t.u.},$$

is considerably in error. This conclusion is confirmed by computing H above 212 degrees, in terms of H_{212} , from the throttling experiments of Grindley, Griessmann and Peake, and the direct specific heat determinations of Knoblauch and Jakob. The result is

$$H = H_{212} + 0.3745(t - 212) - 0.000550(t - 212)^2.$$

The best value of H_{212} seems to be 1150.3 B.t.u. The range of the new formula is from 212 degrees to about 400 degrees. The greatest error in Regnault's formula in this range is 6 B.t.u. at 275 degrees, but if extrapolated to higher temperatures the error in it increases very rapidly.

Below 212 degrees the observations of Dieterici, Smith, Griffiths, Henning and Joly show a thoroughly satisfactory agreement among themselves and prove that Regnault's formula runs high, the error reaching 18 B.t.u. at 32 degrees. There are corresponding errors on the specific volume values ordinarily used.

Discussing this paper, Prof. C. H. Peabody, well known as the compiler of steam tables, admitted that the author had made it evident that it would be necessary to reconstruct our steam tables, and further discussed some of the phases of the subject. He declared that the error in the practical ranges of the steam tables is not over one-half of 1 per cent., so that it is not very serious for ordinary work. Prof. R. C. H. Heck, Lehigh University, believed that with the throttling method as used by Davis and also in the work by Professor Thomas, of which an account was given in a paper presented at the December, 1907, meeting, the fact that the steam may not be homogeneous throughout is likely to have introduced an appreciable error. Prof. L. S. Marks, Harvard University, had submitted a discussion which was presented for him by Professor Hollis. It referred to curves that will be published in the *Transactions*.

There followed two papers by the same author.

Fuel Economy Tests.

BY C. R. WEYMOUTH, SAN FRANCISCO, CAL.

It reported tests of a 15,000-kw. electric generating station having steam engine prime movers, installed at the plant of the Pacific Light & Power Company, Redondo, Cal., and with which crude oil was used as fuel for the boilers. The plant was described, the tests outlined, the conditions under which the tests were made explained and data given in the form of tables and load curves. The results indicated a remarkable economy of the plant as a whole under conditions of commercial operation, and a marked uniformity in fuel economies for all fractional loads from about one-half to the maximum load tested. It was the author's belief that these results warrant a careful investigation of the possibilities pertaining to superior plant fuel economy when using the more modern types of steam engines as prime movers.

Unnecessary Losses in Firing Fuel Oil and an Automatic System for Eliminating Them.

BY C. R. WEYMOUTH, SAN FRANCISCO, CAL.

In this paper the author presents as a solution of the problem of automatic firing of steam boilers in plants burning liquid fuel an automatic system of regulation. Its development and the details of its construction are explained as applied in the Redondo plant of the Pacific Light & Power Company. The apparatus involves an oil pump governor affected by variations in the boiler pressure so that it regulates the oil pressure in the main, varying simultaneously in all boilers the quantity of fuel burned so that a practically uniform steam pressure is maintained. This variation of pressure in the oil main is the secondary means for controlling the steam supplied to the burners to atomize the oil, and also controls the amount of damper opening and thereby the air supply for combustion. The arrangement has been in successful operation and has been the means for considerably increasing the boiler economy in several ways.

These papers were read for the author by Prof. D. S. Jacobus, Stevens Institute, and were discussed together.

Prof. William Kent thought unfair the paper's detracting from the credit of the steam turbine because it employs a higher vacuum than the reciprocating engine can take advantage of. He did not consider that the paper showed anything in favor of reciprocating engines. He said that there were too many variables in the calculation, and to deduce comparable conclusions it would be necessary to test steam turbines under the same conditions. W. D. Ennis wanted to know in what respect, if any, this is a very efficient plant. J. R. Bibbins did not agree that the test shows such exceptional economy for reciprocating engines and believed that better results would be obtained with steam turbines under the same conditions. This seemed to be the trend of all the discussions. There was, however, no question as to the accuracy of the test reported by the author. I. E. Moulthrop thought that the author was to be congratulated for having built a very excellent station. Closing for the author, Professor Jacobus explained that the test was not simply one of engines, boilers or generators, but a total plant efficiency.

WEDNESDAY EVENING LECTURE.

A popular lecture on the same subject as that of the paper by Major Squier presented at the morning meeting was given in the evening in the auditorium by Lieut. Frank P. Lahm of the United States Signal Corps and a member of the Aeronautical Board. For many years Lieutenant Lahm has experimented with dirigible balloons for war purposes and has participated in several of the international balloon races, winning in 1906 the James Gordon Bennett cup. He has also taken part in the experiments at St. Louis, and in the recent ascensions at Fort Meyer, Va., with Orville Wright. A large number of lantern views of various types of dirigible balloons and aeroplanes and moving pictures of the Wright machine in flight made the lecture particularly entertaining and instructive.

FOURTH SESSION.

A collection of papers on the subject of machine shop practice was considered at the session Thursday morning in the auditorium. The first of this number was

Efficiency Tests of Milling Machines and Milling Cutters.

BY A. L. DE LEEUW, CINCINNATI, OHIO,

of which a somewhat extended abstract was given in *The Iron Age* December 3.

F. J. Miller discussed the power required by machine tools, stating that while it varies widely, this is to be expected. He questioned the correctness of making high power millers of the knee and column type, believing that for very heavy work the familiar planer type is better. He wished that a drawing might have been included in the paper to show the drive of the machine tested. Wilfred Lewis, president of the Tabor Mfg. Company, reported on tests along similar lines with which he was familiar. In these tests $1\frac{1}{2}$ cu. in. of metal per horsepower had been removed, and for the work a cutter which had given excellent results was used, which he described. F. W. Taylor wanted more put in the paper about the train of gearing to show why the efficiency of the machine described by Mr. De Leeuw was so high. Prof.

J. J. Flather believed that efficiency should be secondary to output. As averages of the capabilities of various types of machine tools, he stated that a lathe will remove about 1 lb. of metal in a minute at an expenditure of 0.4 hp., a planer the same amount in the same time for 2.5 hp. and a milling machine the same for 10 hp. Regarding the author's declaring a lack of data on the horsepower required for machine tools, he referred to experiments by Hartig in Germany, made several years ago, which were exceedingly complete. He believed that since the advent of high speed steel tools more of these problems should be investigated.

Mr. De Leeuw in closing stated that there seemed to be a tendency to use the knee and column type of milling machine now for heavy rough shop work as well as tool-room work, and said that his tests were not claimed to be complete. In reply to the criticism that there was a lack of detail, he explained that he tested only a few machines, otherwise he should have believed in giving all details. It was not meant to claim one machine the most efficient in the world. The next paper,

Development of the High Speed Milling Cutter, with Inserted Blades for High Powered Milling Machines,

BY WILFRED LEWIS AND WILLIAM H. TAYLOR, PHILADELPHIA, PA.,

described a milling cutter in which were used inserted helical blades of high speed steel, mounted in a steel holder to give a solid backing of the blades on the driving side, while a soft metal filler was used on the opposite side to give uniform support. The blades are held securely and are easily removed by the method adopted, and the cutter has been found to be one of a capacity probably in excess of any machine now on the market, a phenomenal endurance of these cutters having been witnessed in the experiments so far made.

Written discussion of this paper was presented by F. J. Miller, who spoke of forming cutters nearly always being made with radial faces to the teeth. The cutter described in the paper was one having a lip angle or forward inclination at the cutting edges. Oberlin Smith wanted to know what lubricant should be used in cutting steel and brass, and desired to know the experience which has been had with casting inserted teeth in boring and other tools, also what rake is proper. Replying to the first question, F. W. Taylor said it is a question if it is possible to get lubricant between the tool and the work. Cooling is the only thing accomplished by the lubricant, and cold water is as good as anything else. Soap or soda in the water simply serves to prevent rusting. A. L. De Leeuw told of using jets of air focusing upon the tool to accomplish the cooling. In this way cast iron was turned at 165 ft. per minute and steel 200 ft. per minute cutting speed. This was years before the Taylor-White steels were brought out. Oberlin Smith spoke again describing experiments in which liquid air was used to cool tools, but did not prove commercially successful. He also wanted his question answered as to what is the best rake of the teeth for milling tools for cutting steel, brass, cast iron, &c., and his other question with regard to lubricants. He disagreed that oil has no other value than that of simply cooling.

Questioning the statement by Mr. Taylor that the lubricant cannot be retained between the cutting edges of tools and the work, Prof. R. T. Stewart cited the drawing of wire and tubing when the lubricant does play a part, for all drawing must have a lubricant and according to the per cent. reduction different lubricants must be used. For a 33 1-3 per cent. reduction it is found necessary to use a lubricant, and as molecular flow occurs the pressure between the die and the stock must be as great as that between a tool and its work. To show the difference between the cases cited as analogous, Mr. Taylor drew sketches on the board, still maintaining that the lubricant cannot get between the work and the tool. This was a lathe tool, however, and it was pointed out that milling cutters were under discussion and that with them the lubricant is poured on the cutter and not on the work.

Answering another question raised by Mr. Smith, Mr. Taylor stated that high speed steel would be spoiled by casting in a cast iron holder. Mushet steel would be

all right, or self-hardening steel. In other words, red hardness is lost at a temperature of about 1250 degrees. The author gave angles for cutting different metals which have been found proper in shop practice. In closing his paper Mr. Lewis stated that their lip angle was about 15 degrees.

Metal Cutting Tools Without Clearances.

BY JAMES HARTNESS, SPRINGFIELD, VT.

This paper described a turning tool that is intended to cut without clearance, and consists of a cutter and holder so constructed as to allow the cutter a slight oscillatory freedom on the holder. This oscillation about the center line does not affect the position of the edge, but does allow the face of the cutter to swing around to conform to the face of the metal from which the chip is being removed. The purpose is to make possible using more acute cutting edges to reduce the cutting stresses; to equalize wholly or partly the unbalanced side pressure on the cutting edge, and to obtain a rubbing contact to prevent lateral quivering. The author's conclusions were: The no-clearance cutter relieves the edge from the one-sided pressure; prolongs the life of the cutter by allowing abrasion on its face without producing negative clearance; prevents lateral quivering; converts the lip angle into cutting angle, which for a tool of given form constitutes a gain of from 5 to 10 degrees in cutting angle; has extended the working range of the side tool which gives the minimum separating stress; and has made possible the use of acute angled tools which reduce the cutting stress, thereby increasing the output of machines which have been limited by lack of pulling power. The reduction of the cutting and separating stresses has increased the accuracy (or output, which is generally interconvertible with accuracy) on nearly all lathe work. This reduction also increases the output which has been limited mostly by the frailness or the slenderness of the work.

H. H. Supplee called attention to the fact that a number of years ago wood cutting tools were used without clearance.

Interchangeable Involute Gear Tooth Systems.

BY RALPH E. FLANDERS, NEW YORK.

Following a description of standard gear teeth, this paper proceeded with a mathematical treatment on the effect of varying the pressure angle and the addendum with reference to interference, number of teeth in continuous action, side pressure on journals, strength, efficiency, durability, permanence of form, quietness and smoothness of action, suitability for practical cutting processes and miscellaneous practical considerations. Typical involute tooth systems were compared with respect to these considerations, and in conclusion the author suggested the need of an alternative gear tooth standard of shorter-addendum and increased pressure angle for heavy slow speed gearing.

In presenting the paper the author also left the question with the society as to the advisability of appointing a committee to determine upon such a standard.

W. Lewis, discussing the paper, told of the time when cycloidal teeth used to be the standard. They had tried to approximate the size of the tooth with circles in place of cycloids, but never with very much success. He proposed that a committee be appointed to consider standard systems of interchangeable gearing. L. D. Burlingame quoted Frank Burgess of the Boston Gear Works as saying that a long tooth gear has less vibration and runs smoother than a short tooth gear. Written discussions were presented by B. F. Nesbit and C. W. Hunt. The latter offered a written discussion which was read by the secretary. It gave what he considered to be the best dimensions for teeth, and included the Hunt tooth formula. He indorsed a cutter having wings on the ends to trim the ends of the teeth so that out-of-roundness may not affect the accuracy of the completed gear. Oberlin Smith indorsed standardizing, and also stated his desire to see experiments performed to determine what proportions are necessary for various kinds of service. He wanted the committee instructed to make investigations of the shapes and dimensions of gearing. At this point it was necessary to adjourn and the meeting was continued in the afternoon, simultaneously with the sessions of the gas power section and the miscellaneous section, later referred to.

Prof. F. DeR. Furman, Stevens Institute, began the afternoon's discussion. He expressed the belief that easy running gearing is not to be expected with a system comprising a range from the 12-tooth pinion to the rack. He considered there was as much reason for a stand-

ard crank pin as for a definite standard system of gearing. E. R. Fellows of the Fellows Gear Shaper Company suggested that the author's deductions were based apparently on an attempt to determine the form of the gear cutter itself, a matter which is considered more or less a manufacturing secret. He showed a chart comparing the performances of involute gearing with stub tooth gearing, the curves showing the relation between the efficiency of operation and what he called the running conditions, such as degree of noiselessness and the like. At 70 per cent. efficiency, which he referred to as the condition likely to be met in average practice, the running conditions with the involute gearing was placed at 73 and the running conditions with the stub teeth at 83. A. L. De Leeuw felt that the paper raised the question about the propriety of an investigation as to whether or not the proper shape of gear teeth is now available, and Willis H. Diefendorf of the New Process Raw-Hide Company argued the need of a special line of gearing, desirable particularly in the automobile industry, where the field is in process of development and the conditions are trying and noiselessness in running is paramount. He believes the distortion that is brought about in gearing through hardening and annealing processes tends very much to bring about inaccuracies in the shape of the teeth. F. J. Miller described an experience of the Pratt & Whitney Company some years ago in which a number of gears were all mounted side by side in the cutting, and while to all intents and purposes were exactly alike, some were noiseless in the working tests, while others were much the reverse. The discussion came to a close with the adoption of a resolution that the council be requested to look into the advisability of appointing a committee to investigate the question of interchangeable involute gearing.

Spur Gearing on Heavy Railway Motor Equipments.

BY NORMAN LITCHFIELD, NEW YORK.

This paper dealt with the breakage of gearing in heavy electric railroad service, as typified by the equipments of the Interborough Rapid Transit Company, New York, which operates the Elevated and Subway lines. A resumé was given of the methods employed to overcome the breakage, and the strains in the teeth as calculated by the Lewis Formula were shown. Attention was called to the fact that this formula is not entirely applicable on account of the difficulty in maintaining alignment of gear and pinion.

The burden of a discussion by F. V. Henshaw was that the conditions outlined in the paper were really worse than stated. Professor Furman presented an analysis of the form of tooth suggested by the author, showing that the stresses developed at the root of the tooth in the case of the special form were considerably less than those reached with the standard form. He brought out also that involute teeth made with $14\frac{1}{2}$ degree pressure angle are stronger in the proposed form than teeth designed with the 20-degree pressure angle, although the reverse is true in the case of standard forms. The addenda of the teeth are not equal. He added that in referring to standard teeth he meant the teeth as designed according to the known data available in print, as given in Kent's Mechanical Engineers' Pocket-Book. George L. Fowler regarded the paper as an important one from the practical standpoint and emphasized that the problem of geared wheels is not so much the shape of the gear tooth as it is the material of which the tooth is made. Some buyers of railroad equipment emphasize hardness, although experience has sometimes shown that hardness does not necessarily mean wearing qualities. He pointed out that another difficulty in railroad motor operation is the annoyance and loss caused through a purchasing agent not buying the desired kind of grease for lubrication, the high pressure developed between the teeth requiring a grease that will not allow the teeth to wear dry, but will remain sticky and adhere to the teeth. Mr. Diefendorf spoke of the satisfactory results in the use of $3\frac{1}{2}$ per cent. nickel steel in automobile gears, obtaining a material showing a tensile strength over 200,000 lb. and an elongation of 15.6 per cent. The point brought out is that while alloys have shown up well in gear work, such are not commercially possible with street railroad motor equipments.

FIFTH SESSION.

General Section.

The main session of Thursday afternoon, which was held in the auditorium, took up first the following paper:

Liquid Tachometers.

BY PROF. AMASA TROWBRIDGE, HARTFORD, CONN.

The Veeder liquid tachometer* was shown by the author and described. The principle on which it acts is that the pressure developed by the centrifugal force of the liquid when the instrument is running at a certain speed is a definite quantity. This pressure forces liquid up the indicating tube, and is balanced by the pressure due to the height of the column of liquid in the tube. This height depends on the centrifugal force, which varies with the square of the speed of the pump; hence, the graduations are more open at the top of the scale for the high speeds than at the bottom, where the low speeds are measured. The sensitivity of the instrument is such that at the maximum speed for which it has been made commercially, namely 2500 rev. per min., a difference of one or two revolutions is very noticeable. This tachometer has been used for laboratory service in testing dynamos, engines and other machines, also as a speed indicator for automobile and locomotive service.

The second paper was on

Training Workmen in Habits of Industry and Cooperation.

BY H. L. GANTT, PAWTUCKET, R. I.

Repeating the explanation of the bonus system of rewarding labor, which was given in a paper he read before the society in December, 1901, the writer says:

Under this system each man has his work assigned to him in the form of a task to be done by a prescribed method with definite appliances and to be completed within a certain time. The task is based on a detailed investigation by a trained expert of the best methods of doing the work; and the task setter, or his assistant, acts as an instructor to teach the workmen to do the work in the manner and time specified. If the work is done within the time allowed by the expert, and is up to the standard for quality, the workman receives extra compensation in addition to his day's pay. If it is not done in the time set, or is not up to the standard for quality, the workman receives his day's pay only.

With the advent of the scientifically educated engineer, capable of substituting a scientific solution of shop problems for the empirical solution of the mechanic, the responsibility of training workers shifts to the shoulders of the former. Unskilled workmen, who, under the régime of an instructor, a task and a bonus, have become skilled in one kind of work, readily learn another, and soon begin to realize that in a measure at least they can make up for their loss in not having learned a trade. As they become more skilled they form better habits of work, lose less time, and become more reliable. Habits of work in a mechanic are comparable with habits of thought in an engineer, and our industrial schools should make proper habits of work the basis on which to build their training in manual dexterity. Under the task system the workman is taught how and trained to do at the same time, and it is found that the habit of doing efficiently what is laid out for him becomes so fixed that he performs without hesitation tasks at which a man not trained to follow instructions would absolutely fail. Many capable men who were impatient of restraint when they should have learned a trade find themselves at the age of 25 or less in the class of unskilled workmen. These men, when they come to realize the difference between a skilled workman and one not skilled, often furnish some of the best task workers. Under this system, where each man has his task, a gang boss usually tends a group of workmen, supplying them with work and appliances and removing their work when finished. Such a man is paid a bonus for each workman who earns a bonus and an extra bonus if all of his group earn their bonuses. Thus the gang boss is sure to help the poor workman all he can.

In the past few years, while there has been so much talk about the growing inefficiency of labor, the author has repeatedly proved the value of this method in increasing efficiency. As the workmen are ever ready to help disclose and remove the obstacles that prevent their earning their bonus the managing problem is greatly simplified. Not only does the careless worker whose bad work prevents some other from earning his bonus fall into disfavor, but the foreman and superintendent who is lax in his duty finds his shortcomings constantly brought before him by the man whose duty it is to investigate all cases of lost bonus.

Dr. Rudolph Roesler said that in Europe great interest is being taken in the new method of workshop management, as it was recognized that for one thing it weakens the contention of the social democrats in giving increased opportunity to shop workmen. He referred to the fact that the German engineering press is giving attention to the system described and similar ones; to the experience of the Ludwig Loew shops at Berlin, with

* Described in *The Iron Age*, May 31, 1906.

the premium and bonus system, and to the further fact that the technical universities in Germany are devoting special study to these methods. A discussion by Charles Piez, president of the Link Belt Company, Chicago, was read by J. M. Dodge, chairman of the same company. It called attention to the distinctly human element in the system described. It recognizes that men are willing to work at any reasonable speed in a reasonable way if properly trained and suitably rewarded. A good deal of system idolatry exists to-day, and it needs to be remembered that system does not produce output, but indicates the lines on which output may be secured. Direct lines are not always the most resultful in connection with such a system. Great care and tact are necessary, lest the element of discord come in.

Lewis Sanders had found that the great benefit of the task and bonus system is that skillful men are always devising new methods of reducing costs, which can then be employed with untrained men. A case was cited in which one man was expected to read each of 12 thermometers once in 2 min. He was only able to read eight, but a way was found which enabled him to read the 12 thermometers in 1 min. and 50 sec. A workman took 1 min. 40 sec. to set a piece in a jig. A way was found to do this in 20 sec., and with less work. Once established, the task system will produce good results if faith is kept with the men. It is very essential that accurate investigation precede the setting of a task.

Contributions to the discussion made by H. K. Hathaway, C. N. Lauer and T. Kelly were read. One point brought out was that under the Taylor system it is possible to turn out apprentices in about half the time required under the old system, since now the planning department does so much for them. An instance was cited of a workman trained in a month to run a drill press. A milling machine was mastered in the same time. The further points were made that while the manager who depends on his ability to drive his employees is bound to fail, the Gantt system has the spirit of helpfulness as one of its principal features; that since the workmen find that poor work in other departments cuts down their earnings a feeling of pride in the character of work turned out is stimulated and the "good enough" workman cannot hold a place.

J. C. Jurgensen described an application of the task and bonus system to the power and heating plant at the St. Regis Hotel. In the fireroom a 10 per cent. cash bonus goes to the firemen for securing certain results from coal with a specified percentage of ash. The coal passers are also in the arrangement. Harrington Emerson had found in his experience in standardizing shop operations that training workmen in habits of industry was the easiest end of it. The great desideratum is to train managers in habits of logical thought and co-operation. Illustrating the wide disparity often found in costs, due to the lack of proper system and study of operations by some managers, he cited the cost of locomotive repairs per mile on four trunk lines leading out of New York. On one road it costs 44 mills per mile traveled to maintain locomotives in first-class condition. For the other three roads this cost is 7 cents, 12 cents and 16 cents per mile respectively. The road with the highest cost has a total locomotive travel of 30,000,000 miles in a year, so that its waste on locomotive repairs may be reckoned at \$3,600,000. A waste like that does not lie with the workmen, but with the management. In reply to a question whether the high cost road referred to did not have a good deal of hill climbing, Mr. Emerson said that the high cost road had the best grades, while the low cost road had the hardest grades.

Further interesting discussion of the paper was given by M. P. Higgins, William Kent and J. M. Dodge. Mr. Higgins considered the setting of the task and the giving of the bonus as important disciplinary measures, developing both mental power and manual skill. He considered that training a body of skilled workmen meant training the superintendents and managers of the future. Mr. Kent found one of the beauties of the Taylor and Gantt systems in the fact that they harmonize with the humanitarian idea of benefiting the workmen. Mental inertia is often a difficulty with managers. So many

men in authority consider their time so valuable that they fail to see the \$10,000 saving they might make by devoting a half hour to the study of a proposed departure. Mr. Dodge, answering the inquiry occasionally made whether the Link Belt Company had abandoned the Taylor system, said that it was in continuous and successful operation at Philadelphia and would be more generally introduced at Chicago and Indianapolis. He recalled that Mr. Taylor had said that the best results would be secured in hard times, and this had proved true. In response to his question as to the effect upon earnings at the company's plants of a 50 per cent. reduction in volume of business, he was told by the local managements that several thousand dollars a month would be lost at each, but under the test of the past year of slack business a profit had been made every month.

An abstract was read of a paper on

Salt Manufacture,

BY GEORGE B. WILLCOX, SAGINAW, MICH.

The paper recited the more recent development in mechanical methods and appliances at some of the large salt plants operated by what is known as the steam grainer system, as distinguished from the vacuum pan system and the solar or open air system. The design of evaporating grainers of reinforced concrete was illustrated and explained, together with details of the rakers which remove the salt from the grainer bottom as fast as it is formed and deliver it up an incline at one end of the grainer. The conveyor system and the device for loading salt barrels into box cars were also described in detail.

The paper on

Industrial Photography,

BY S. ASHTON HAND, CLEVELAND, OHIO,

is given nearly in full elsewhere in this issue. The discussion was participated in by C. H. Woodbury, C. W. Hunt, H. H. Suplee and Ambrose Swasey. Referring to Mr. Hand's recommendation that polished parts of machinery be rubbed with putty to dull the brightness, it was stated that in photographing silver ware this result was obtained by dusting white powder in the air around the object, some of the particles settling on the ware. Painting with salmon pink was recommended instead of drab, as the latter makes the parts "flat," and the warmer color is better. Mr. Hunt's communication contained a table showing the length of exposure which yields the best printing negative for every hour of the day and every day in the year. Mr. Suplee referred to the serviceableness of the moving picture machine in presenting a series of pictures of an operation of very short duration. By slowing down the speed in the machine the elements of the operation might be studied at leisure. Another use of photography to which he referred is the reproduction on a much reduced scale of important drawings; the photographs thus secured can be put away for safe keeping in comparatively small space.

The last paper of the afternoon was on the

Articulated Compound Locomotives,

BY C. J. MELLIN, SCHENECTADY, N. Y.

Mr. Mellin, who is consulting engineer of the American Locomotive Company, gave an account in a paper covering 30 pages, of the adaptation of the Mallet locomotive to heavy service in the United States. In 1902 the American Locomotive Company decided to work out a design of a powerful locomotive for the Baltimore & Ohio railroad. It provided for two sets of engines under one boiler, capable of adjusting themselves independently to the alignment of roads with curvatures up to 30 degrees, on the principle developed by Mallet. This B. & O. locomotive was exhibited at the St. Louis Exposition in 1904. A great number of locomotives of this type have since been built for other roads, and the writer considered them to be forerunners of the most powerful and efficient type of the freight engine of the future. The Mallet articulated arrangement presents the advantages of great tractive power with practically no increase in the individual weights of the moving and wearing parts over those of ordinary type engines; double expansion of the steam; simplicity and ease in operation, and a short, rigid wheel base with the weight distributed over a long total wheel base, resulting in the greatest flexibility and ease on track and bridges. Opinions on the use of a truck in the use of an articulated engine are divided. The author considered a front truck in freight service objectionable in view of first cost, maintenance, dead weight, and unfavorable distribution of machinery. A more serious matter is backing with a front truck, as this necessitates a rear truck, or the curing of one evil with another. Over 100 locomotives of

the Mallet type have been built in the United States, ranging in weight on drivers from 106,000 lb. to 410,000 lb., and from 20,000 lb. to 125,000 lb. in tractive power. The largest of these is taking the place of three ordinary sized locomotives.

F. L. Cole, Schenectady, N. Y., emphasized flexibility and uniform distribution of load as advantages of the Mallet locomotive. It was first built in 1887 and there are now about 500 in use in Europe. While intended for light, narrow gauge service originally, the designs developed in this country for heavy service have a number of conspicuous advantages, which the speaker detailed, laying stress on the adaptation of the heavy type to hill climbing and to sharp curves, also on the refinement secured in the equalization of load. Harrington Emerson spoke of two things which had occurred in recent time tending to postpone the electrification of steam roads. One was the panic, which emphasized the extravagance of making so large a part of railroad equipment obsolete; the other was the heavy locomotive of the Mallet type.

L. R. Pomeroy emphasized the commercial consideration in comparing the electric and steam locomotives. On mountain roads the chief claim for electric haulage is that the tonnage per train can be nearly doubled without a corresponding increase in crew expense. Figuring this out for one particular railroad division having 2.2 per cent. grades, there was a saving of \$65,000 a year. Roundly this may be capitalized at \$1,000,000. The speaker figured that Mallet locomotives would cost about one-third as much as electric locomotives to give the same service.

S. M. Vauclain, superintendent of the Baldwin Locomotive Works, presented a written discussion of the paper, illustrating it with lantern slides. These traced the evolution of the Mallet type for heavy service in the hands of the Baldwin Works and showed the various modifications made to meet the demands of the officers of prominent lines, particularly the Great Northern, the Santa Fé and the Southern Pacific. The speaker took square issue with the writer of the paper on the matter of leading and trailing trucks. While the Baldwin Works designers at first eliminated these trucks, they were demanded by the railroads and are provided for in all late designs.

Gas Power Section.

Thursday afternoon, in another of the smaller meeting rooms, the gas power section assembled, with Chairman C. E. Lucke presiding. Business matters first disposed of included a report of the Membership Committee by its chairman, G. A. Orrok, which announced the election of 36 members and 17 affiliate members. The Meetings Committee had no report. The Standardization Committee has reached no definite conclusions to date and could simply report progress. Discussing the subject of standardization in the methods of rating gas power apparatus, L. S. Marks presented through Professor Hollis a written discussion, which gave a rapid method of obtaining accurately the hydrogen content in the volatile matter of any fuel, such as coal, lignite or peat. The discussion favored the use of what is known as the lower heat value in computations for the heating value of the fuel, which is the theoretical heating value and is based on the chemical analysis, being the heat due to the contained carbon and hydrogen. There was also given a curve from which the British thermal units corresponding to a given content of hydrogen can be at once obtained. Professor Kent disagreed with the foregoing, arguing that the higher heat value should be used, this being that actually found by coal calorimeter tests. It is what the speaker had used in fuel calculations in his book on Steam Boiler Economy. He discussed the curve given by Professor Marks and showed curves of his own for heating values of coal in terms of their analyses. J. R. Bibbins called attention to the excellent work on calorimetry done by the American Gas Institute. He believed that it will be of considerable value. Chairman Lucke indorsed this work as the best on gas calorimetry that has ever been done.

The Committee for the Revision of the Code for Testing Gas Engines has just recently been formed, and

had no report to give at this meeting. This committee consists of C. E. Lucke, chairman; Prof. D. S. Jacobus, G. H. Barrus, E. T. Adams and Arthur West. The Executive Committee reported the election of officers, as follows: Chairman of the section, F. R. Low; secretary, G. A. Orrok; Executive Committee, F. H. Stillman, G. I. Rockwood, Prof. R. H. Fernald, Prof. F. R. Hutton and H. H. Suplee; chairman of the Membership Committee, R. T. Lozier, and chairman of the Meetings Committee, C. P. Poole.

The Executive Committee recommended appointment of the following committees: Nominating Committee, 9 members; Tellers Committee, 3 members; Library Committee, 15 members; Installations Committee, 3 members (the duties of which will be the listing of installation of gas power); Committee on Plant Operations, Committee on Accidents, and Committee on Question Box, 5 members.

The introduction of the new officers of the section, Chairman Low and Secretary Orrok, was followed by the first paper,

Reminiscences of a Gas Engine Designer,

BY L. H. NASH, BROOKLYN, N. Y.

This gave a brief outline of experimental work conducted in the past by the author, and aimed to stimulate thought along the line it covered. Some of the author's inventions described were failures, commercially, and others have taken their place as steps in the development of gas engine construction. Of interest was the fact that the two-cycle type of engine now built so largely by various gas engine manufacturers was originally designed by Mr. Nash and branded as of not sufficient commercial value. Brief mention was also made of a method of operation for marine purposes, many of the chief features of which are in more or less active use to-day, although there are others which seem to possess value enough to warrant their being brought to the attention of the engineering profession.

Prof. S. A. Reeve was particularly interested in two methods of outside compression in the author's paper. Clark in 1880 tried one of them. The speaker also put on the board diagrams of a cycle in which the charge is compressed before explosion on the explosion stroke and the extent of this compression or the length of time before cut-off occurs gives opportunity of governing on the immediate stroke instead of 180 degrees later. This variable cut-off style of engine also has the advantage of a characteristic in which the maximum efficiency is at some fraction of the maximum load. In all other engines the maximum efficiency is at maximum load. The speaker mentioned difficulties which had killed this type of engine and also discussed other peculiar types of engines and their features, one of them a type spoken of in the author's paper.

Possibilities of the Gasoline Turbine,

BY PROF. FRANK C. WAGNER, TERRE HAUTE, IND.

An abstract of this paper was presented in the absence of the author, by Secretary Suplee. In it it was stated that to reduce the temperature of gases at the turbine wheel either an excess of air or water ignition may be used. The relative efficiency of the two methods was shown to depend upon the amount of compression used, and the efficiencies of the turbine and the air compressor. The work required to compress the air may be materially reduced by using two-stage or three-stage compressors with intercoolers. It appears that with high compression a gasoline turbine may be expected to give efficiency comparing favorably with reciprocating gasoline engines.

A written discussion of this paper was submitted by Sanford A. Moss.

C. E. Lucke spoke of investigations of nozzles, which are the means of transforming heat into work in a turbine. He sees no possibility for a gas turbine until a nozzle can be found that will give material cooling of the gas under expansion. He has never succeeded in doing this yet. Chairman-elect Low then took the chair and declared the meeting adjourned.

Proposed Machine Shop Section.

In the afternoon, Thursday, those interested were invited to attend a conference regarding the formation of a section of the society on the order of the gas power section to consider particularly subjects of machine shop interest. F. W. Taylor was elected temporary chairman and L. G. French temporary secretary, and

following a discussion of the scope which the section should include and its appropriate title, a resolution was adopted that the chair appoint a committee of three to formulate definite plans for a machine shop section and submit them to the council for consideration and approval, and that the committee report the results at a meeting of this body at the Spring meeting of the society. This committee was appointed. There is every evidence that such a section will meet with enthusiastic support on the part of the members of the society, a large proportion of which are directly or indirectly interested in subjects pertaining to machine tools and machinery.

RECEPTION.

Thursday evening, in the society's rooms on the eleventh floor of the Engineering Societies' Building, was held the one distinctively social feature of the meeting—the annual reception to the retiring and newly elected officers. The members and their guests were received by President M. L. Holman, President-elect Jesse M. Smith and Mrs. Smith, Secretary Calvin W. Rice and Prof. and Mrs. F. R. Hutton. Dancing on the fifth floor and a collation on the sixth occupied the remainder of the evening.

SIXTH SESSION.

The last professional session of the meeting was held in the auditorium Friday morning to consider a group of papers on experimental data. The first was

Physical Properties of Carbonic Acid and the Conditions of Its Economic Storage for Transportation,

BY PROF. R. T. STEWART, PITTSBURGH, PA.

This paper gave the results of recent investigations into the physical properties of carbonic acid, necessary in investigating the strength and safety of existing carbonic acid cylinders and in the design of new cylinders on a safe and economic basis. The results of this investigation have made it possible for the first time to state the conditions under which the weight of the containing cylinder will be a minimum for the customary conditions of storage and transportation of carbonic acid. The paper was accompanied by very complete tables, covering, it is believed, a range of conditions sufficient for the solution of any problems apt to arise regarding the physical properties of carbonic acid in connection with its storage and transportation. There was also an addendum showing the necessity of a further investigation of the carbonic acid cylinder problem, especially as regards the most suitable steel for cylinder construction and the safety of cylinders now in use.

On the above paper John C. Minor, Jr., presented a written discussion. H. F. Durkee also presented a discussion. The speaker from the standpoint of a manufacturer of carbonic acid gas welcomed the paper, but did not accept its conclusions. With regard to the hazard attending the present method of handling and storing carbonic acid gas, he stated that only about one cylinder explodes in three years, or about one cylinder in about 5,000,000 cylinders filled. A written discussion from Graham Clarke was presented in abstract by the secretary, and H. E. Stürcke also presented a written discussion. Col. E. D. Meier spoke on the subject from a boiler manufacturer's standpoint and as the conditions in a boiler are somewhat the same as those in a cylinder containing gas under pressure, the requirements in the metal are, or should be, somewhat similar. He does not believe that phosphorus in any steel, acid or basic, should be allowed; that failures are due in all instances to the phosphorus contained.

In closing his paper Professor Stewart considered that it had been misinterpreted; he had intended it to be a monograph on the physical properties of carbonic acid gas in their bearing on cylinder design, and the addendum was simply to bring out discussion. It stated present practices, did not intend any originality, and was purposed principally to instigate investigations.

The Slipping Point of Rolled Boiler Tube Joints,

BY PROF. O. P. HOOD AND G. L. CHRISTENSEN, HOUGHTON, MICH.

The object of this paper was to supply data regarding the behavior of joints made by the familiar process of rolling boiler tubes into containing holes. Attention was called to the fact that the stress at which the tube slips is as important as the ultimate strength of the joint. The results of experiments on tube holes of various forms and with

various degrees of rolling was shown by plotted curves, and a simple method was indicated whereby the slipping point of the usual joint may be raised so high as to bring the full elastic strength of the tube into use.

This paper was presented in abstract by F. W. O'Neill and passed without discussion. The next paper was presented by its author.

Tests on Friction Clutches for Power Transmission.

BY PROF. R. T. DUKES, CLEVELAND, OHIO.

This paper gave the results of tests on friction clutch couplings to determine their maximum capacity. The tests were made for the Hill Clutch Company, Cleveland, O., in connection with the development of their positive action type of clutch. Five examples of the best known types of clutches were purchased in the open market. These clutch couplings were all of the same nominal size, 24 in. in diameter, and were all tested under similar conditions. Each clutch was subjected to a series of cone pressures, gradually increasing in amount, the maximum load which the clutches would pick up and carry being determined for each cone pressure. The power was absorbed in the ordinary way on a prony brake.

G. N. Vanderhoef presented a written discussion of the paper, in which he gave it as his opinion that in all clutches where wood and metal are used in contact it is better to expose the end grain of the wood to the rubbing. P. E. Welton of the Falls Rivet & Machine Company read correspondence from and to that company, in which it was brought out that one of the company's clutches was not sent for testing in connection with the test reported, but that the company would be glad to have a test made by any disinterested party. Professor Dukes in closing his paper gave a little more concerning the circumstances under which the test had been made and the purpose of the test. The last paper of the meeting,

An Averaging Instrument for Polar Diagrams,

BY PROF. W. F. DURAND, LELAND STANFORD UNIVERSITY, CAL.

The familiar planimeter for areas cannot be used to determine the average ordinate of a diagram plotted in polar co-ordinates. In recent years the use of dial recording gauges of various kinds has greatly increased, such instruments commonly tracing a polar diagram with a curvilinear path of the tracing point. This paper dealt with the application to such diagrams of an instrument proposed by the author some fifteen years ago, and at that time considered only with reference to polar diagrams plotted with linear radial ordinates. It was shown that a simple form of integrating element consisting of a plain, straight arm sliding radially through a smooth pivoted sleeve or socket, such arm carrying an integrating wheel, similar to that of the planimeter, may be so used as to derive from diagrams drawn by modern forms of recording gauge and extending over any angular interval, a time average of the radial ordinate, and hence of the engineering quantity under measure.

This paper passed without discussion.

The usual resolution of thanks to all who had contributed to the entertainment of the society and its guests was offered by Prof. L. P. Breckenridge and was adopted, following which the meeting adjourned.

EXCURSIONS.

Wednesday Morning.

THE AMERICAN MFG. COMPANY through its president, Anderson Gratz, extended an invitation to visit its rope and twine manufacturing plant at Greenpoint, L. I. The process of manufacture, from the opening of the bale on the wharf to the finished product in the store-room, was demonstrated.

THE SINGER BUILDING TOWER was visited by invitation from E. P. Coleman, secretary of the Singer Mfg. Company. The Singer tower, being the highest completed structure in New York, is the best vantage point for viewing the city and bay and was particularly enjoyed by those from out of town. The modern power plant of the building was open for inspection.

SWIFT & Co. invited the society to visit their plant at 152d street and Brooks avenue, Bronx, through the courtesy of M. F. Mallon, chief engineer. The feature of this plant was the producer gas power plant, containing Smith gas producers, and four Rathbun engines of 100 hp. each, running refrigerating machinery and dynamos.

Wednesday Afternoon.

THE GOLDSCHMIDT THERMIT COMPANY, through the courtesy of W. R. Hulbert, invited the members and

guests to its plant at Jersey City, N. J. The welding of a lug on a motor casing by the Thermit process was witnessed, and also the welding of a boss on a plate, a pipe weld and a rail weld. Some specimens were exhibited, including a piece of welded pipe that had been flattened by hammering, welded rails, bent welded pipe, &c. The various welding processes were described and explained by E. Stütz, vice-president and general manager of the company. After refreshments were served a group picture was taken and the party returned in the automobiles that had been provided by the company to bring them to the plant. Scarf pins representing a crucible discharging Thermit metal into a mold were distributed as souvenirs.

THE J. H. WILLIAMS COMPANY's drop forge plant in Brooklyn, N. Y., was visited, and the heating, forging, trimming, case hardening and finishing processes were shown and explained.

THE QUEENSBORO BRIDGE and approaches were visited through an invitation extended by Commissioner J. W. Stevenson. The visitors were permitted to walk half way across from the Manhattan end to inspect the connecting joint, and were shown the method of adjusting the spans to the same level, and also the pins on which the cantilever rests.

THE MANHATTAN RUBBER MFG. COMPANY, through its president, A. F. Townsend, invited the members to its plant at Passaic, N. J. The trip proved very interesting on account of the diversified line of mechanical rubber goods shown in the process of manufacture. Special transportation was arranged by the company over the Delaware, Lackawanna & Western Railroad, and a light lunch was served en route.

Thursday Morning.

THE PENNSYLVANIA RAILROAD'S DEEP WATER TERMINAL at Greenville, N. J., was visited, the invitation being extended by F. L. Du Bosque, assistant engineer of floating equipment of the Pennsylvania Railroad. The docks, electric cargo cranes, yards and modern electrical machinery were examined. An opportunity was afforded to see the mechanism of a 10-ton gantry cantilever crane during the operation of unloading structural material and machinery from a railroad car into a barge. A novel method of transferring cars from a float to the docks was witnessed. This is done by adjusting the apron of the dock to the level of the car float, and the latter brought in place by two flexible electric winches. Four 6-in. square iron bolts are placed in position from the apron to the float, which brings the track connections into alignment, and the cars are drawn from the float by a locomotive and dummy car. The dummy car is used to keep the weight of the heavy engine off the adjustable apron. The operator's room, the counterweights and operating mechanism were inspected. The Pennsylvania Railroad furnished a special boat for the trip.

THE NEW YORK FIRE DEPARTMENT'S PUMPING STATION at West and Gansevoort streets, having a pumping capacity of 18,000 gal. per min. at 300 lb. pressure, proved very interesting. By the courtesy of I. M. de Varona, chief engineer of the Department of Water Supply, Gas and Electricity, the party was permitted to go through the several stations, and was conducted to and from them in four taxicabs. The pumps used are of the six-stage centrifugal type, and the motors are of the 800-hp. induction type, operating on a 6600-volt system. Either salt or fresh water may be pumped. A fire was reported while the visitors were present, which afforded them the pleasure of seeing the station operate while doing actual service.

THE JOSEPH DIXON CRUCIBLE COMPANY was open for the inspection of the members and guests by invitation from G. E. Long, treasurer. The various departments of the plant and the manufacture of Dixon's graphite specialties were shown.

THE METROPOLITAN TOWER AND POWER PLANT, by the courtesy of the Metropolitan Life Insurance Company, was visited by several parties. The tower is now under construction and when completed will be the highest structure in New York.

Thursday Afternoon.

THE NEW YORK EDISON COMPANY'S WATER SIDE STATIONS Nos. 1 and 2 were open to inspection, where 142,500 kw. is distributed between Westinghouse and General Electric turbines and steam engines. Taylor gravity underfeed stokers, Roney mechanical stokers and Babcock & Wilcox boilers are installed in these stations. This is the largest turbo-electric plant in the United States.

THE BROOKLYN NAVY YARD trip, the invitation for which was extended by Admiral Casper F. Goodrich, commandant, was attended by members of the society, who were conducted through the commandant's office, the ordnance and pattern stores, the boats, the foundry and the machine shop.

THE QUEENSBORO BRIDGE trip was repeated.

Friday Morning.

THE PENNSYLVANIA TUNNEL & TERMINAL RAILROAD COMPANY, through Alfred Noble, chief engineer, invited the society's members and guests to the East River tunnels. The sinking of the shafts, the construction and placing of the tunnels, and materials used were described in a pamphlet distributed at the head of the shaft. A walk was taken through the tunnel to Long Island City, a distance of 4000 ft. The large party which made this excursion was conducted in groups by engineers of the Pennsylvania Tunnel Company.

THE JOHN THOMSON PRESS COMPANY, at Nott and East avenues, Long Island City, L. I., was inspected through the invitation of John Thomson. The gas power plant at the company's factory contains a 200-hp. Taylor suction producer operating two Nash gas engines.

THE CROCKER-WHEELER COMPANY, at Ampere, N. J., received visitors at its works and showed them through the various departments, explaining the manufacture of motors and generators. The party was conducted by Gano S. Dunn, vice-president and chief engineer of the company, from whom the invitation was received.

Other invitations which had been extended to the members and guests of the society were as follows: The New York Central & Hudson River Railroad's Port Morris power station, Atha Tool Company's plant, Trenton Iron Company's gas power plant, Interborough Rapid Transit Company's power plant, exhibit of original manuscripts at Columbia University, and an organ recital by Mr. Baldwin at the College of the City of New York. The latter, with special trips to department stores, points of general interest and luncheons, were provided for the entertainment of the ladies in attendance.

Buffalo's Industrial Exhibition.—The Manufacturers' Club of Buffalo, N. Y., has made arrangements for an industrial exhibition to be held in Convention Hall, December 14 to 19, to be participated in by all the local manufacturers, to demonstrate the varied and extensive lines of industrial productions in Buffalo and to increase the patriotic interest of its citizens in the consumption of goods "made in Buffalo." Almost every inch of space in the large hall has been allotted to exhibitors, who are arranging to install working exhibits. The decorations are designed to be a prophecy and illustration of Buffalo—busy, but smokeless—and aim to show that a city can be busy without polluting the air, and that this condition is especially possible in Buffalo by electric power. The booths will be equipped with large brick chimneys, and the general effect will be of the representative industries of the city run at full blast, but with not a particle of smoke from the chimney stacks. The Manufacturers' Club aims to help bring about an era of cheaper electricity.

The returns of the American Railway Association show that the number of idle freight cars increased from 109,515 on November 11 to 123,619 on November 25. The high mark was reached on April 29 at 413,338. The low point was 100,073 on October 28.

Of the 58,730 shareholders of the Pennsylvania Railroad Company about 28,000 are women. The average holdings of all the stockholders are 107 shares.

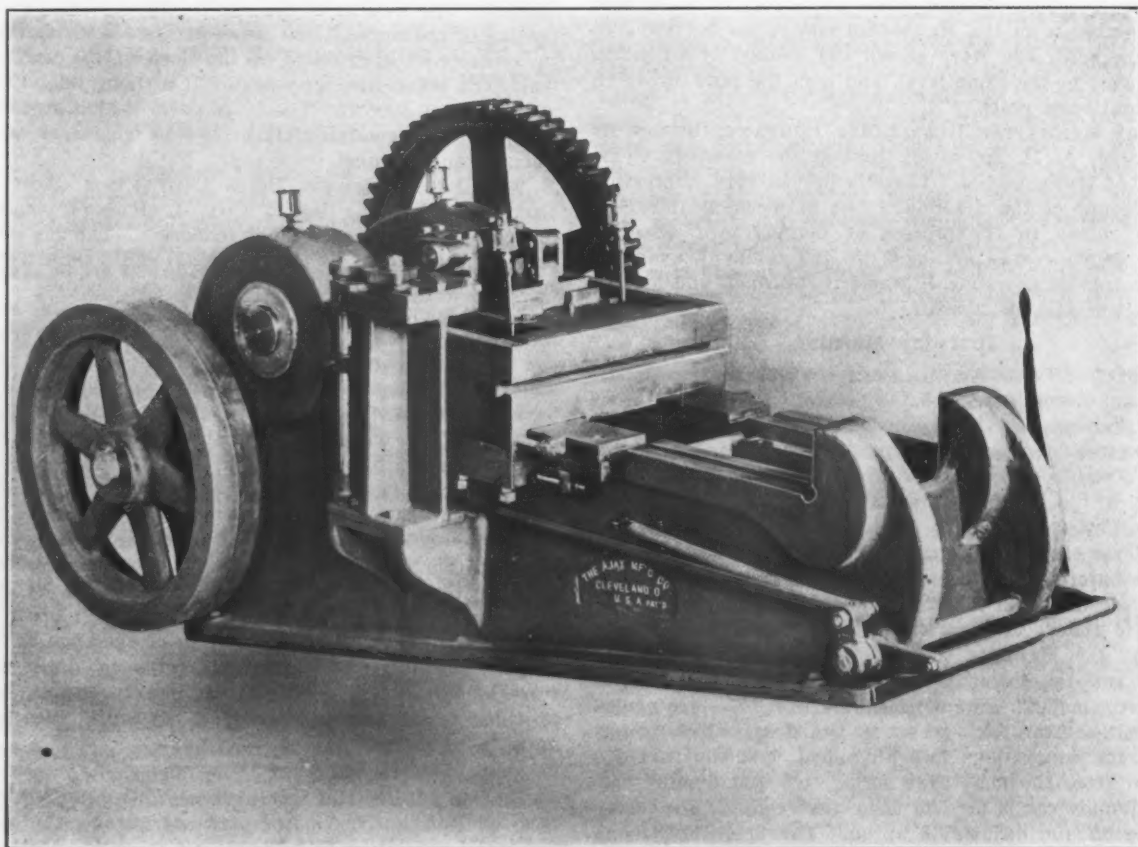
A New Ajax Bulldozer.

As distinguished from the usual slow speed bulldozer the new machine of the Ajax Mfg. Company, Cleveland, Ohio, is designated as a high speed, stop motion bulldozer. It is claimed to embody a number of improvements over the older pattern. Rapid movement, as just suggested, is the principal and distinguishing feature of the machine, the cross head on the No. 1 machine making 60 forward and back movements or cycles per minute, and the No. 6 machine 45 cycles. In spite of this high speed the operator has perfect control of the machine at all times through a foot treadle or hand lever, either of which throws the mechanism into or out of operation, causing the cross head to make one complete cycle and then stop, wide open.

The bed is a steel casting with an inclined surface, which facilitates placing the stock in the dies. The gears are machine cut and all wearing parts are lined, and

rather rigid test recently before it was shipped. An arch bar $\frac{5}{8}$ x 3 in. was bent cold with a pocket 8 in. deep, and the four corners were bent at a single operation, with no evidence of labor.

The Brighton Car Company Expanding.—The Brighton Car Company, operating a car repair plant at Chicago, has purchased a site comprising 50 acres of land at St. Louis Park, a suburb of Minneapolis, Minn., where it will establish a branch plant. Present plans of the company contemplate the erection of car building and car repair shops upon this site, but these will not be put into execution until some time next spring. In the meantime a building 90 x 150 ft., formerly occupied by the Minnesota Sugar Company, will be equipped with machinery for car repair work and run through the winter. During this time only repair work will be undertaken, but when the new factory is completed operations will be extended to include the building of new cars. Motive power will



The High Speed Stop Motion Bulldozer Built by the Ajax Mfg. Company, Cleveland, Ohio.

all bearings are bushed with bronze. The cross head has a long bearing surface and is equipped with adjustable gibs to take up wear and keep the cross head in alignment. Principally the machine is intended for doing work cold, and while it is primarily a bending machine, it can also be used as a press or shear. On account of the high speed of the cross head a greatly increased output is possible as compared with that obtained on the ordinary machines. If the stock is of a material that will stand cold bending a considerable saving of fuel is accomplished.

Following are the principal dimensions and weights of the smallest, intermediate and largest sizes, known as Nos. 1, 3 and 6. No. 1 occupies a floor space of 5 ft. x 2 ft. 2 in., has a cross head 16 x 4 in., with a travel from 5 to 8 in., the standard being 5 in., and weighs approximately 2200 lb. The No. 3 size occupies 10 x 3½ ft. of floor space, has a cross head with working surface of 28 x 8 in., traveling from 5 to 10 in., the standard being 8 in., and weighs approximately 9500 lb. The No. 6 size occupies a floor space of 16 x 7½ ft., has a cross head face of 60 x 10 in., cross head stroke of from 5 to 14 in., the standard being 10 in., and weighs about 24,000 lb. A No. 3 size of this machine recently sold to the Diamond Mfg. Company, Detroit, Mich., was given a

be supplied by electrical current furnished from an outside source, and the tools will be operated as far as possible with individual motors. Practically all of the equipment for the temporary plant has been arranged for, but a considerable amount of new machinery will be required to equip the new plant when it is completed.

The Cincinnati Foundry Foremen.—On the evening of November 28, the Cincinnati section of Associated Foundry Foremen enjoyed a dinner at its new quarters in the Grand Hotel and listened to a number of interesting topics of a technical nature. The principal addresses were made by F. O. Clements, chemist, Dayton, Ohio, and E. H. Schwartz, Chicago.

Fourteen-inch guns for the United States Navy have been designed and will be manufactured for future battleships in the Washington gun factory as soon as Congress authorizes the small appropriation necessary for the enlargement of the factory building to accommodate this additional product. The facilities of the factory are not at present adequate to assembling a gun of the length required.

Caskey Hydraulic Valves.

A new valve for hydraulic, steam and air service, for which special merit is claimed, is being introduced by the Caskey Valve Company, 422 Arcade Building, Philadelphia, Pa. A particular feature of the valve is that it becomes more effective as the pressure under which it is used increases.

In the construction of this valve, as will be seen from Figs. 1 and 2, which show a valve for operating single ram hydraulic presses, the taper plug as well as all pockets where scale or grit might lodge have been done away with. There is also a change from the usual flow

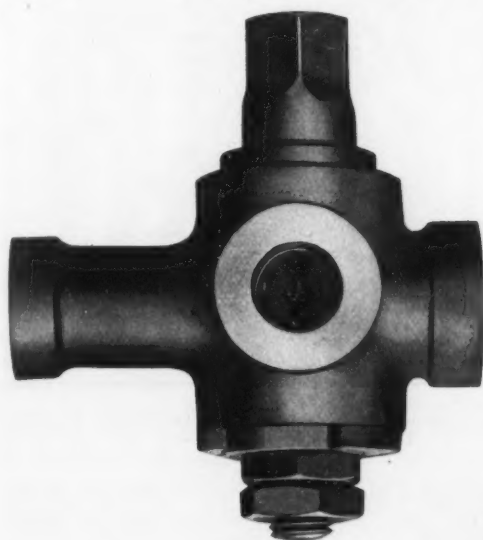


Fig. 1.

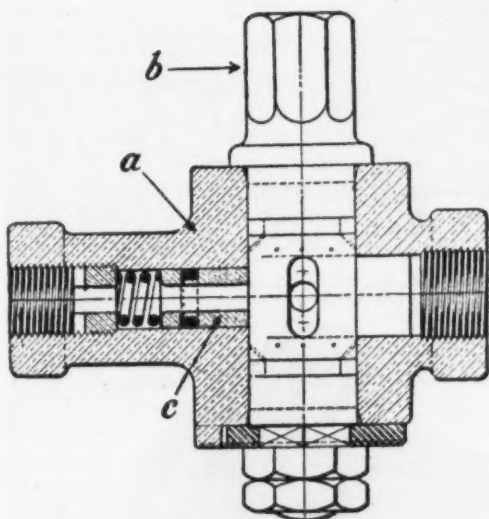


Fig. 2.

Exterior and Sectional Views of the Caskey Valve for Operating Single Ram Hydraulic Presses.

passages and a general reduction in area. As shown in Fig. 2 the valve comprises the body *a*, straight plug *b* and bushing *c*, the latter being ground to fit the plug. To insure perfect contact between the plug and bushing a spring is provided, as shown. The bushing is recessed and this space filled with a washer, the latter having small port holes at the back, so that pressure may be admitted at the back of the washer, which forces it out, thereby making a tight joint, which increases in effectiveness as the pressure increases. There is no exposed seat in this valve, and, the plug being straight, makes it evenly balanced throughout. The construction on the whole is simple, no stuffing boxes nor valve seats being required, and fluttering is entirely eliminated. After service trials, under exacting conditions, satisfactory results are reported under working pressures ranging from 250 lb. per square inch, with 5-in. valves, up to 10,000 lb. with the ¼-in. valves.

The same constructive principle has been adopted in the manufacture of a large number of valves for different purposes, particularly where quick, accurate control with a maximum efficiency in maintenance is desired. Figs. 3 and 4 illustrate the straight-through blow-off valve of this type, in which ease of operation and positive action are the features claimed. Hydraulic valves of the two or three pressure type for long stroke presses, where the maximum pressure is not used throughout the stroke, but which are made to automatically throw on the heavy pressure at any part of the stroke, are made on the same general principles as those of the simpler type.

These valves are being made in brass, steel or iron, in a varying range of sizes, according to the purpose intended, but in general range from ¼ to 5 in. in size; special sizes are also made for particular purposes.

Drawback Regulations.

The Treasury Department's regulation of February 19, 1906, providing for an allowance of drawback on rails, billets, plates and other steel products manufactured by the United States Steel Products Export Company in part from imported iron ore, have been extended, so far as applicable, to cover the exportation of steel



Fig. 3.
The Caskey Blow-off Valve for Locomotive Use.

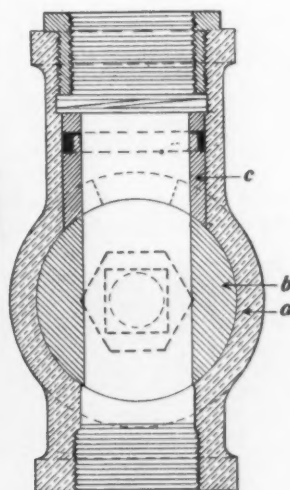


Fig. 4.

rails manufactured by the Bethlehem Steel Company, South Bethlehem, Pa., with the use of imported iron ore. In liquidation, the quantity of imported iron ore which may be taken as the basis for the allowance of drawback may equal that claimed in the drawback entry after official verification of exported quantities, and such verification of the quantity so claimed by examination of the manufacturing records, as the chief officer of customs may direct, but in no case shall such amount exceed 1.8 tons of imported ore for each ton of steel rails exported.

Benefits of drawback have also been granted to cover rotary snow plows manufactured by the American Locomotive Company with the use of imported tires, boiler tubes, copper plates and other parts. The same requirements now prescribed with respect to the payment of drawback on locomotives manufactured with the use of similar imported parts will be applied to exportations of snow plows.

The North German Lloyd steamship *George Washington* was launched October 31 at Bredow, Germany. This vessel is the largest German built and owned steamship afloat. It is 722 ft. 5 in. long, 78 ft. beam, 54 ft. deep from the upper saloon deck, 80 ft. deep from the awning deck, and has a displacement of 36,000 tons at a draft of 33 ft. It will carry 2941 passengers and has a cargo capacity of 13,000 tons. A speed of not less than 18.5 knots will be obtained by two four-cylinder quadruple expansion engines of 20,000 i.h.p.

Industrial Photography.*

BY S. ASHTON HAND, CLEVELAND, OHIO.

Photographs of machinery, interiors of shops, products of machines, processes of manufacture, &c., are generally made to aid the selling department of an establishment in disposing of its product. Sometimes the photographs themselves are used as an advertising medium, but in the majority of cases half-tones are made from them for use in catalogues, or for illustrations in trade journals. Catalogues have of late years developed into veritable works of art, and their preparation calls for photographic work of the highest order. To this end it should be the aim of the photographer to produce prints that will require the least retouching when used for making half-tones, and this for two reasons: First, the retouching of prints for half-tone work is quite expensive; second, the print that requires the least retouching gives much the best results in the finished half-tone. A print which requires very little retouching to produce a first class half-tone is a good one for all other purposes, but a print good enough for all other purposes may be a

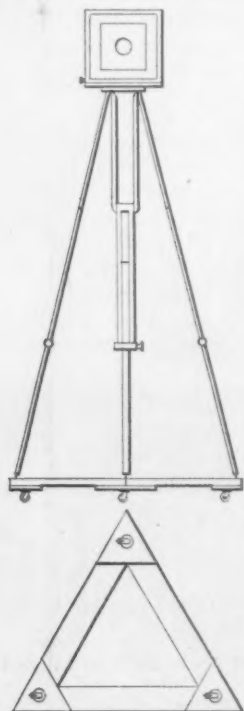


Fig. 1.—Tripod with Triangular Base.

very poor one from which to produce a first class half-tone.†

Nearly all industrial establishments are equipped with a photographic outfit of some kind, and in some instances an experienced photographer is in charge; but in the majority of cases one of the draftsmen must take care of all the photographic work of the establishment, and it is in the hope of aiding some of the latter that this paper has been prepared

Apparatus.

The camera should be a strong and serviceable one having a long bellows with very little cone. In fact, one with a perfectly straight bellows is best, as it allows greater adjustment of the lens board without danger of the bellows folds cutting off any of the object. The vertical and side swings should be ample. The camera need not be larger than $6\frac{1}{2} \times 8\frac{1}{2}$ in., and should not be larger than 8×10 in., as anything over this size is cumbersome to handle, and requires a very expensive lens and a great deal of skill to operate. If large prints are wanted, bromide enlargements can be made up to any reasonable size, and if for any reason large direct or contact prints are wanted, a slightly enlarged positive can be made from

* A paper read before the American Society of Mechanical Engineers, New York, December 3, 1908. Mr. Hand is superintendent of the Chandler & Price Company, Cleveland.

† The accompanying illustrations were made from photographs on which there was no retouching.

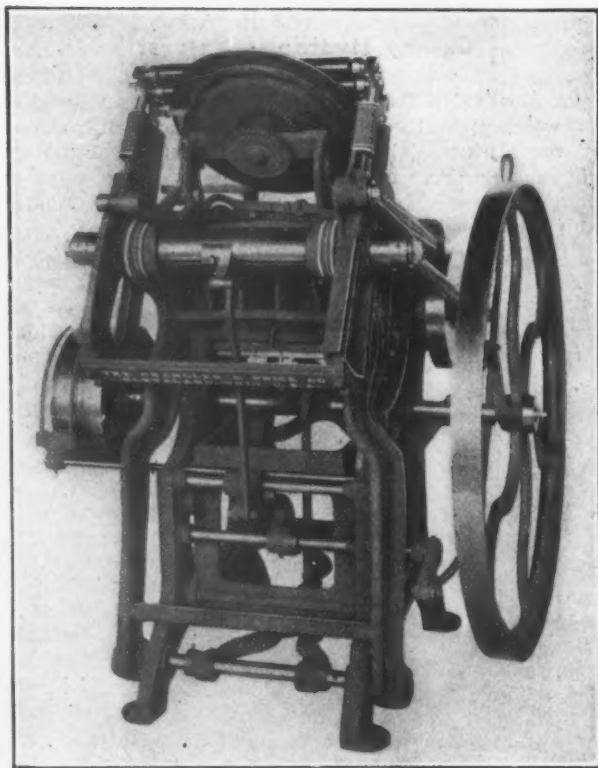


Fig. 2.—Details Brought Out and Shadows Avoided by Preparation of Machine Parts.

the negative, and a negative as large as wanted can be made from the positive. This procedure has its advantages, as it is often possible to correct in a great measure any errors in exposure or development, and many errors in lighting and position. The writer never uses a camera larger than $6\frac{1}{2} \times 8\frac{1}{2}$ in., and has produced many excellent enlarged negatives up to 24×36 in., by the method above mentioned.

The tripod should be solid and stiff with the fewest possible joints. An excellent thing for use with it is a triangle with sides about 36 in. long, and with a roller or caster under each point as shown in Fig. 1. With the tripod mounted on this arrangement, the camera can be moved any distance or in any direction without material change in level. The lens should be the best obtain-

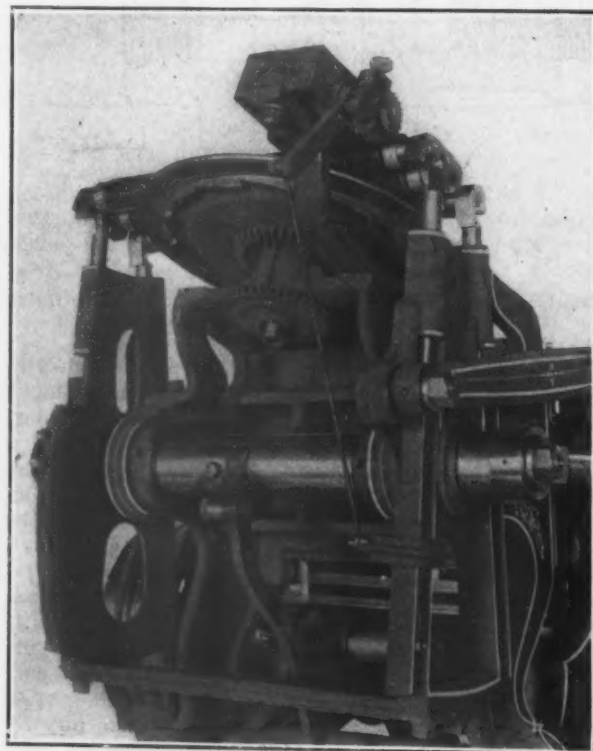


Fig. 3.—A Detail of Fig. 2.



Fig. 4.—Distorted View Made by Pointing the Camera Upward.

able, and too great emphasis cannot be placed on its being of long focus. Never under any circumstances should its focus be shorter than the diagonal of the largest plate with which it is to be used. It should be capable of rendering sharp definition from corner to corner of the plate when using a comparatively large diaphragm. A lens of this character will render the focusing much easier, and will enable the exposure to be made in the shortest possible time. The plates should not be the most rapid made, as the emulsion with which these are coated is not generally rich enough in silver to give printing density for anything but portrait work, and also because the timing of the exposure must be very exact. Unless both exposure and development are just right, the negative will not be "snappy" enough to produce a good, bright print. Very slow plates take long exposures, and unless skillfully handled in development will produce prints with entirely too much contrast. Plates of medium speed are the best and should be of the kind known as "double coated" or "non-halation." Plates of this kind are first coated with a slow emulsion, and after drying are again coated with a somewhat faster emulsion. Plates so coated allow of very great latitude in time of exposure.

If interior views are to be made where windows and other openings to the light have to be faced, then the plates should be coated on the back with a compound known as "backing." This will prevent to a great extent halation or blurring of the high lights caused by reflection of light from the surfaces of the plate under the emulsion. This "backing" should be washed off with a damp sponge before development.

Preparation of Machinery.

If a machine is to be photographed, it should be painted with a finishing coat of drab paint, which may be designated as "mouse color," and the paint should be so mixed as to dry absolutely "flat," that is, without any gloss whatever. If parts underneath the machine or in shadow are wanted to be shown, they should be

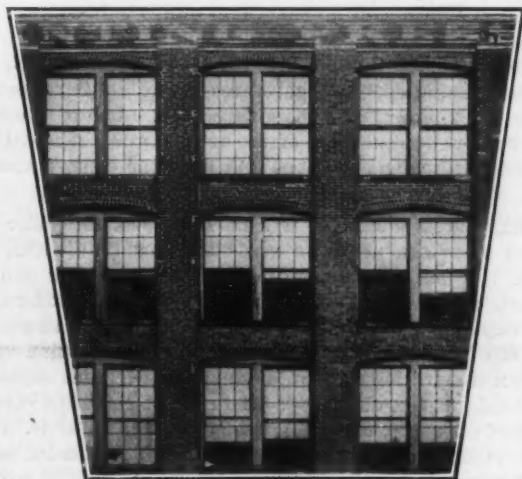


Fig. 5.—Distortion of Fig. 4 Corrected in Reproduction.

painted a lighter shade than the more prominent parts, and the deeper they are in shadow the lighter they should be painted, even in extreme cases blending the color gradually into a white. All brightly polished parts should be daubed or rubbed over with a handful of soft putty to dull the brightness.

Unless these precautions are taken, the parts in shadow will show very dark in the photograph, and if very close together will be seen only as one shapeless mass, and the bright spots will show chalky white with

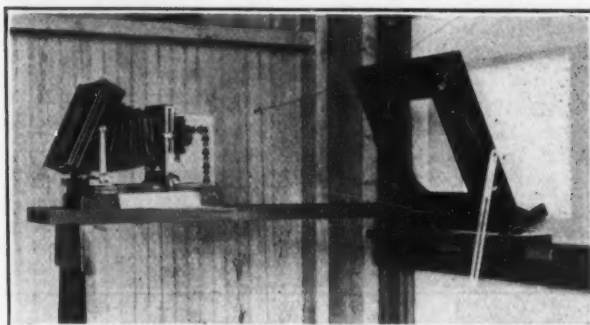


Fig. 6.—Method of Correcting Distortion.

very black lines and little or no detail. If letters or figures cast on any part of the machine are to be shown, daub them with white paint from the end of a finger. Rubbing with chalk will give them a very rough appearance. It must be borne in mind that all high lights and shadows are greatly intensified in photography, and that a sensitive plate that will register all the gradation of tone as seen by the human eye has yet to be made. Figs. 2 and 3 are illustrations of machines that were properly prepared for being photographed.

If possible, it is best to photograph a machine before it has been run; otherwise oil from the bearings will seep

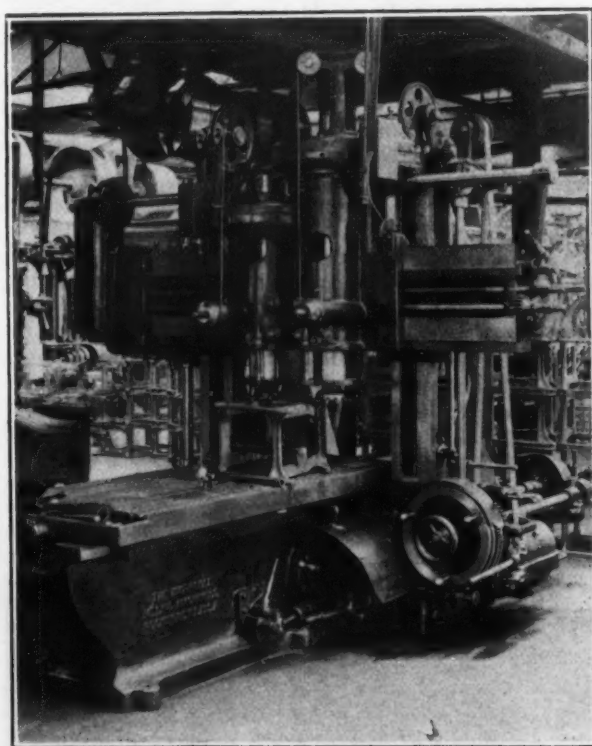


Fig. 7.—Details of a Dark Shop Brought Out by Long Exposure.

out on the paint and leave dark and glossy spots which will look bad in the photograph. If the machine is to be run before being photographed, then it should not have its finishing coat until after the run or test is over. Before the finishing coat is put on, all the bearings should be thoroughly flushed with gasoline and the whole exterior cleaned with the same stuff to remove all oil.

Lighting and Position.

Machinery should never be photographed out of doors or under a skylight, as there is too strong a top light



Fig. 8.—View Taken Without Special Precautions Against Strong Light.—Strongest Light at Far End.

which causes deep shadows. The light should preferably come from the north, and should fall on the machine at a downward angle of about 20 degrees from the horizontal. Cross lights from other windows should be avoided by pulling down the shades or tacking up heavy paper. Cross lights make a confusion of shadows and obliterate certain lines, giving the machine anything but a natural appearance. If necessary to photograph the machine by other than northern lighting, then make the exposure when the sun is overhead. If the exposure must be made when the sun is shining through the windows at any considerable slant, tack cheese cloth over the windows to diffuse the light.

A machine should never be photographed directly from the front; this will make it appear too flat. For depth, the camera should be placed enough out of center to show a little of one side of the machine and high enough to show a little of the top. Heavy drilling, either white or very light in color, should be hung not less than 6 ft. back of the machine. It should be of ample size—large enough so that the camera can be moved where wanted and still show the background behind every part of the machine. If there are folds or wrinkles in the background, have a man at each side take hold of the edges and shake the curtain slowly and gently during the whole time of the exposure. This will prevent the folds or wrinkles from showing in the photograph.

Shop floors are dark in color, and if a machine is photographed directly on the floor it is often puzzling to know where the lower part of the machine ends and the floor begins. Therefore a floor cloth of the same color and width as the background should be used. It should be deep enough to extend from 4 to 6 ft. in front of the machine and under it and to the background. This will define the lower parts of the machine, and also reflect the light upwards, softening the shadows. Instead of a

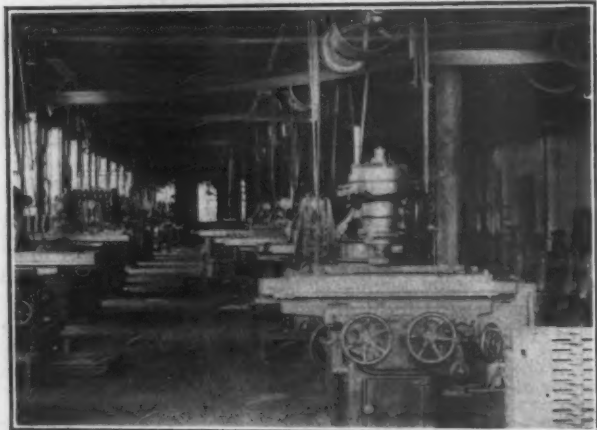


Fig. 9.—Same Conditions as in Fig. 8, but with Strong Light in Foreground.

floor cloth, sheets or strips of light colored paper can be used, but be sure there is no pronounced red or yellow, as such colors are non-actinic and will show black in the photograph.

Focusing.

Never focus on the center of the ground glass, as this will give you the point of sharpest focus of the lens and what is wanted is the average focus; therefore focus at a position midway between the center and the edges of the ground glass. Get the nearest parts of the machine in focus. Small diaphragms will sharpen up the distant parts. Sometimes a better effect can be obtained by pointing the camera slightly downward, but if at any time the camera is used in any other than a level position, the ground glass should be brought to a vertical position, otherwise the result will be distorted lines.

Fig. 4 shows a distorted view of a part of the side of a building, made by pointing the camera upward. If the photograph of a machine shows such distortion, and for any reason it cannot be photographed again, a negative can be reproduced eliminating the distortion, by placing the negative in a frame tilted at such an angle that the narrowest lines are nearest the lens, and making a positive in the camera, tilting the ground glass at an equal angle, but in the opposite direction. A negative can be made from this positive, as shown in Fig. 5, which was actually made from a negative reproduced in the above manner from that used for Fig. 4. Notice how much the top of the negative had to be enlarged to bring the lines

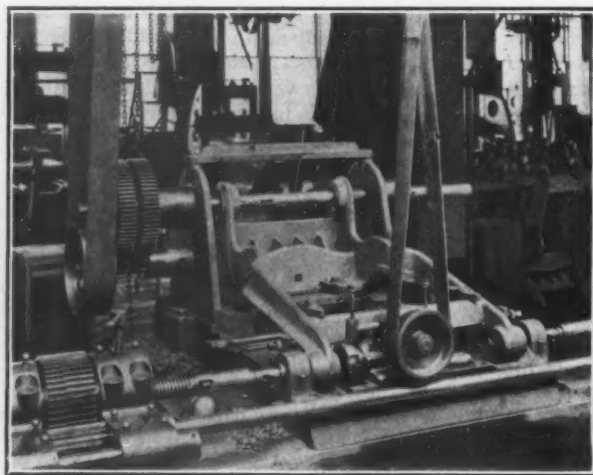


Fig. 10.—Taken with Camera Pointed Toward the Light on Same Day as Figs. 8 and 9.

parallel. Fig. 6 shows a camera and negative holder in the proper position for this operation.

If the machine to be photographed is a long one, requiring a raking view, use the horizontal swing to bring that part of the ground glass on which the image of the farthest part of the machine appears, farthest away from the lens. This will even up the focus and make it possible to use a larger diaphragm, shortening the time of exposure, and also extend the vanishing point to a greater distance, giving it a more normal perspective. If there are perceptible vibrations to the floor on which the photographing is done, get three pieces of harness felt $\frac{1}{2}$ in. thick, and 2 or 3 in. square. Place one of these on the floor under each leg of the tripod, and they will absorb all ordinary vibrations and keep the camera steady.

Exposure.

Exposures should always be ample, as an under exposed plate can never be made to show that which the light has not impressed upon it (although it can be greatly helped by skillful development), but a moderately overexposed plate can easily be treated in development, or even afterward, so as to yield a first-class print. Fig. 7 is an illustration of details brought out by long exposure in the dark part of a shop. If in doubt as to the correct time of exposure, make a guess as near as possible. Suppose your guess to be 4 min., then put a loaded plate holder in the camera and draw the slide so as to expose 2 in. of the plate and make an exposure of 2 min.; cap the lens, draw the slide out 2 in. more, and make another

exposure of 2 min. Repeat this, drawing the slide 2 in. at a time, until the whole plate has been exposed.

If the plate is an 8 x 10, there will be five parts having respective exposures of 10, 8, 6, 4 and 2 min. each. Develop this plate, and it will be easy to tell which part has had the proper exposure, and from the position of this part the time can readily be found.

Interiors.

In photographing interiors, avoid pointing the camera toward windows if possible; but if this cannot be avoided then cover the windows with heavy drilling or thick wrapping paper, fastening it well around the edges, so that no bright margins of light are visible. After the exposure has been made, the window coverings can be removed and an additional exposure of a fraction of a second can be given. This will give the windows a natural appearance and will often show objects on the outside. Interiors can be photographed without these precautions, but skillful work will be required to make good negatives. Figs. 8 and 9 were made on a very bright day when snow was on the ground, and the light coming in the windows was intensely white. As the negatives were wanted in a hurry, no precautions were taken to soften or stop out the light at the windows. The far end of Fig. 8 was a south-

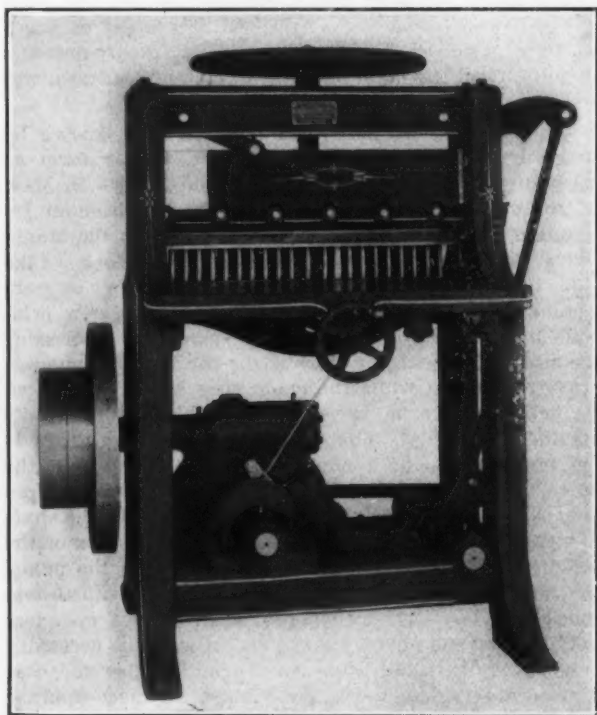


Fig. 11.—Paper Cutting Machine, Showing Clutch Mechanism of Which Detail Is Wanted.

ern exposure, and the sunlight was streaming in at the windows. Fig. 9 is a view in the same room taken from the south end, where the light was so intense that the milling machine in the foreground appears light in color, although it was painted a dark steel color.

Fig. 10 shows work in process in a special machine. This was made on the same day as Figs. 8 and 9, and with the camera pointed directly at the light. To work successfully under such conditions, the photographer must know to a nicety just how long a certain kind of plate may be exposed before halation takes place, and just how to get the best results in development from the shortest permissible exposure.

Copying.

In copying drawings or other subjects in black and white, it is necessary to use a very slow plate, give the shortest possible exposure, and to use a concentrated and well restrained developer. Unless this is done the lines of the drawing will not be clear and sharp. If a copy is to be made from a blue print, it will be necessary to bleach the print in a weak solution of ammonia and water, and after a thorough washing to immerse it in a weak solution of tannic acid. The part that was formerly blue will now be a rich purplish brown. The necessity for this treat-

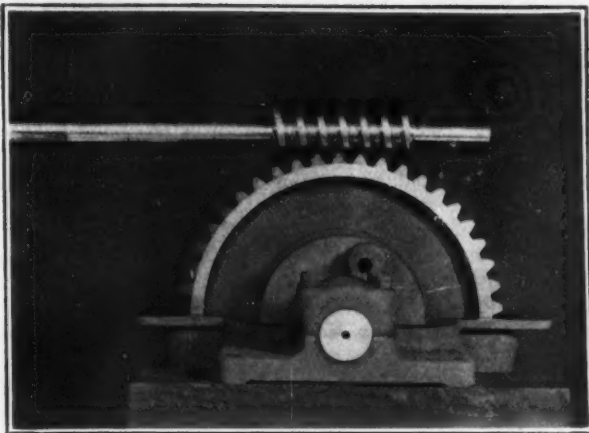


Fig. 12.—View of Worm and Gear with Upper Part of Case Removed.

ment is that blue is an actinic color, and a negative made from such a print will have very little contrast, while brown is a nonactinic color and a negative made from a print of that color will have plenty of contrast.

A negative can be reproduced in a larger size by first making a positive in the copying camera, and then making a large negative from the positive by the use of the same instrument. If a negative is enlarged to many times its original size, a granular effect will be noticed. This is caused by magnification of the emulsion structure which is made up of countless thousands of hills and valleys. This granular effect can be eliminated by slightly overexposing and greatly overdeveloping the original negative, and then reducing it to the proper density. The positive should have the same treatment.

Reduction does three things:

1. It reduces or clears the shadows faster than the high lights. Therefore overexposure is resorted to in order to increase the density of the shadows in proportion to the high lights, so that they shall bear proper relation to each other after reduction.
2. It thins the density of the negative or positive. Therefore overdeveloping is resorted to in order to have resulting density after reduction.
3. It cuts down the hills to the level of the valleys, so that very little if any granular effect is noticeable when the emulsion is magnified.

In reproducing negatives either in the original or a larger size, there is a splendid chance for what may be termed "jockeying." A brilliant negative may be made from a very flat one and vice versa. Errors in perspective can be corrected by the method shown in Fig. 5. Unequal lighting can be corrected by judicious shading during exposure, and various other manipulations will suggest themselves to the ingenious mind.

X-Ray or Ghost Photographs.

When an illustration is wanted to show clearly some hidden interior part of a machine in relation to and more distinctly than other parts, the usual procedure is to have a wash drawing made in India ink, from which the half-

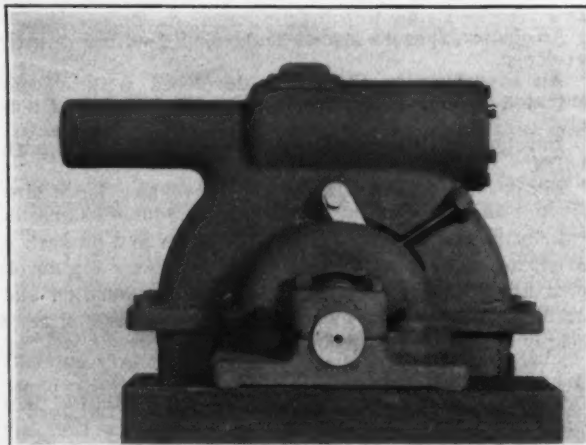


Fig. 13.—Exterior of Case to Be Shown on Same Plate as Fig. 12.

tone is produced. This method is always expensive, and the results are often very unsatisfactory.

Fig. 11 shows a power driven machine for cutting paper, in which the power is transmitted through worm gearing and a positive clutch, all of which is inclosed in an oil tight case, as shown at the lower left hand part of the machine. An illustration showing the worm and worm wheel in mesh was wanted. An engraver was called in, who said he could do the job in a satisfactory manner. Blue prints showing both details and construction were furnished him as a guide to size and shape of the various parts and their appearance when assembled. After repeated attempts his results were not satisfactory, and it was decided to rely entirely upon photographic methods for the illustration.

The case and its contents were removed from the machine and mounted on a box. The upper part of the case was taken off, leaving the worm wheel and the clutch collar exposed to view. The worm and shaft were removed from the upper part of the case and placed in their proper position in relation to the worm wheel, as shown in Fig. 12. A dark background was placed in the rear and an exposure was made. After the exposure the cap was put on the lens, the worm and shaft taken away, and the upper part of the case put in position as in Fig. 13. A light background was substituted for the dark one,

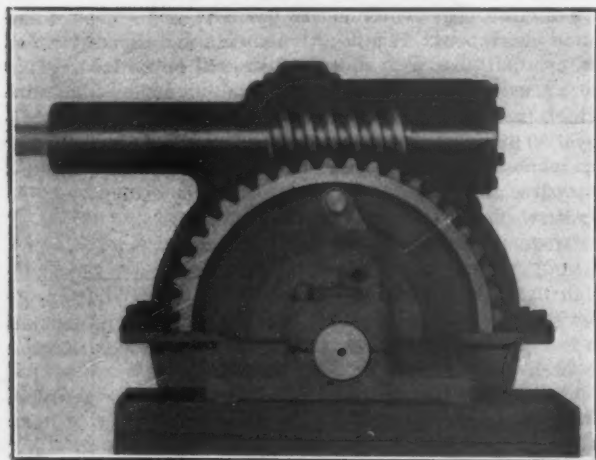


Fig. 14.—Result of Exposures Figs. 12 and 13 on Same Plate.

and another exposure made on the same plate, the result of which is shown in Fig. 14.

Developing and Printing.

In the art of development the only adequate teacher is experience. After many years of experience, the writer would hesitate to attempt to tell in writing how to handle a sensitive plate in development. A few hints, however, concerning the behavior of certain mixtures of developer may be of service.

Too weak a developer makes a flat, thin negative.

Too concentrated a developer makes a negative with too much contrast.

Under developing makes a negative lacking in printing density.

Overdeveloping makes a thick, dense negative requiring a very long time to print.

An under exposure should be developed with a diluted developer.

An overexposure should be developed with a concentrated developer well restrained with bromide of potash.

Developers, like artists' colors, should be mixed with brains.

Better choose a moderately slow developer, learn how to use it and don't let any one persuade you to change it.

Printing can be done in so many ways and on such a variety of papers, and the solutions necessary for developing and toning require such care in compounding and handling, that it can in most instances be better and more cheaply done by a professional.

On December 1 the plant of the Wilkes Rolling Mill Company, Sharon, Pa., manufacturer of muck bar, bar iron and iron and steel sheets, was put in operation after being idle for some months.

The Manly Hydraulic Variable Speed Transmission.

A device for transmitting power at variable speeds from a constant speed source is considered ideal if it has a continuous range of speeds from zero to maximum in both directions, and transmits the motion positively—i. e., without slip. Most forms of friction speed variators fulfill the first condition, but not the second, while with change gear devices it is just the reverse. Thus with all purely mechanical contrivances it seems to be difficult to affect more than a compromise. Electricity or compressed air as media of transmission possess advantages which have led experimenters into those fields, but they, too, have been confronted with the difficulty of obtaining absolutely positive drive. Those who have worked on the scheme of employing a hydraulic medium have recognized that the incompressibility of such a medium, assuming all packings to be tight, insures positiveness, and several such variable speed drives have been developed. In general they consist fundamentally of a pump driven by the constant speed power source, and in turn driving a motor, and all of them with the exception of the one about to be described depend for the variation of the motor speed on by-passing more or less of the fluid pumped, which means a correspondingly great or small waste of power—i. e., their efficiencies markedly decrease in going from the maximum to the minimum transmitted speeds.

The Manly hydraulic variable speed gear, known by the briefer name of the Manly drive, in the form as herewith illustrated, is the invention of Charles M. Manly, for many years connected with the Smithsonian Institution in Washington, and is controlled by the Manly Drive Company, Whitehall Building, New York. Like other hydraulic drives it employs a pump and one or more motors, driven by the pump, but it employs a new principle in the variation of speeds. Instead of by-passing the medium, a means of altering the throw of the pump is provided, so that while the pump runs at constant speed its delivery may be varied from nothing at all to its maximum capacity. The means of varying the throw is the familiar one of a double eccentric, one within the other, by adjusting the relations of which the crank pin may be moved from coincidence with the axis of the shaft to any distance from it up to the combined throws of the eccentrics. Except for the variable throw in the pump, the pump and the motor are practically identical and consist, in the form as usually built, of five cylinders radially disposed about a single crank, with the necessary valves and their operating mechanism similar to those of an ordinary engine or pump. As in the more familiar constructions, the action of the valves is in quadrature with the piston movement, therefore it follows that when the pump throw is altered from some throw on one side of the zero position to some throw on the other side, the functions of the inlet and discharge valves are reversed and the fluid is circulated in the opposite direction. Thus the direction of the engine is reversed, the fluid taking the opposite course through the motor.

It has been common to employ hydraulic media for slow and heavy work, but its application in connection with high and variable speeds is somewhat of a departure. Obviously any liquid could be used, but in the Manly drive oil is employed because it has two characteristic advantages: It lubricates and it does not freeze.

One of the important advantages of the Manly drive is that the torque is inversely proportional to the speed within the limits of the device, which limits may be made almost anything desired by proper design. When the pump stroke is adjusted to something less than maximum, since the same amount of power is put into it as before, the liquid is delivered at a higher pressure to the motor, which, being of fixed stroke, is revolved more slowly, but with a force increased in direct proportion to the increase in pressure. There is obtained then the desirable result that in starting, when the load is the greatest and the speed slow, a powerful torque is applied, decreasing as the speed increases and the load likewise. It can

readily be appreciated that with a very small throw of the pump crank a tremendous pressure can be obtained limited only by the strength of the parts. To avoid damage from any excess of force a safety valve is inserted in the oil piping system, which opens before a dangerous pressure is reached, and the oil thus escaping is returned to the suction side of the pump, so that nothing is lost from the system. It is found in practice that it is perfectly possible to make all joints so tight that no make-up is necessary from leakage in the oil supply. This drive when combined with either a gas engine or an electric

for two reasons: that a simpler means of car control is greatly needed especially in motor trucks to enable them to be driven by unskilled help, and that if the device proves its worth in this field, which is one of its most difficult applications, its adaptability to any other field of variable speed driving is practically assured. Probably the next step taken by the company will be to work out details of a drive applicable to machine tools, and, in fact, all machinery requiring variable speed where the power is furnished at a practically constant speed.

Fig. 1 shows an Oldsmobile rebuilt to incorporate the

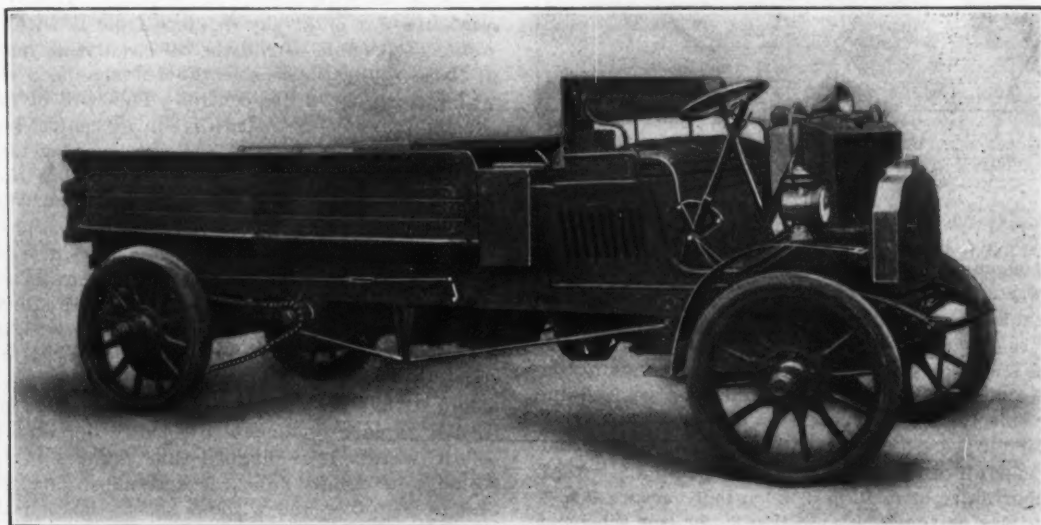


Fig. 1.—A Motor Truck Equipped with the Manly Drive for Testing Purposes.

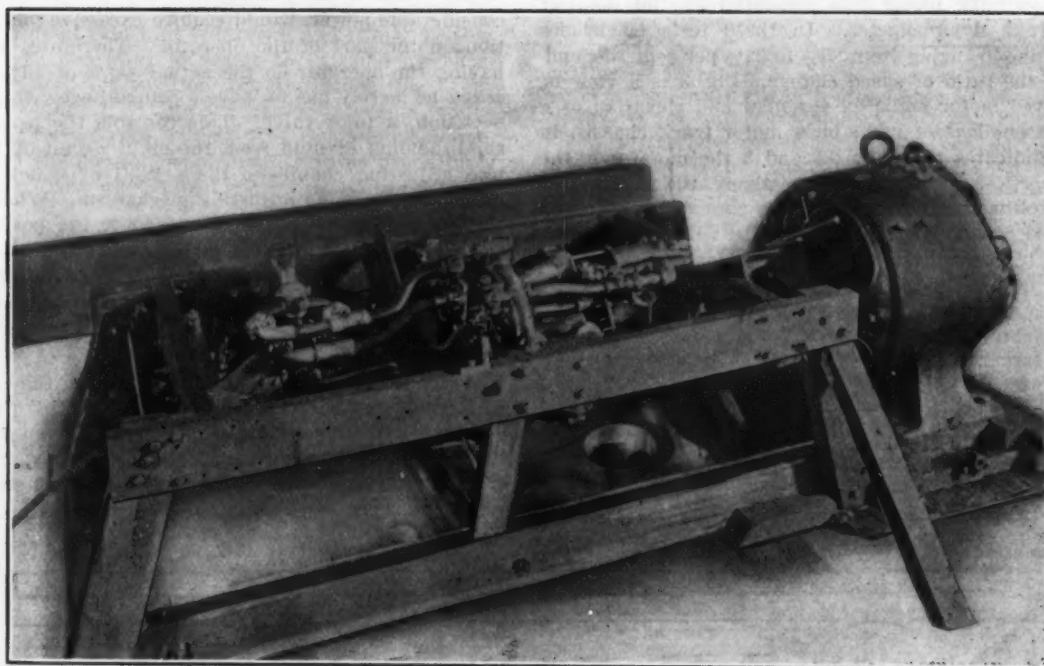


Fig. 2.—The Manly Drive Set Up for Testing.

motor enables the power to be delivered with a greater degree of flexibility than is possible even with a steam engine, for while with steam the torque can be increased at low speeds only by changing the point of cutoff of the engine, and at most to twice its normal value, with the Manly drive the torque increases directly as the speed decreases up to the safe limit of the strength of the driven shaft.

In the experimental machines of this type which have been constructed in the last few years the principle has remained unchanged, but the details of construction and in particular the methods of operating the control have been developed until now they are considered to be commercially perfect. Principally the experimental work has been in connection with an automobile transmission

Manly drive. One pump directly connected to the engine and two motors, one applied to each rear wheel, take the place of the ordinary speed change gear mechanism, brake and differential gear. When the machine is turning a corner one wheel must run slower than the other, the faster running motor will automatically take more and the other less of the oil pumped, which eliminates the need of a differential. When the pump is adjusted to no-stroke the system is locked and becomes a very effective brake. Therefore a single controlling lever the sole function of which is to vary the throw of the pump crank, affords entire control of the automobile except the steering. The machine illustrated, for test purposes is loaded with a ton of stone and gravel, and has been in operation for months to provide a severe test of endurance

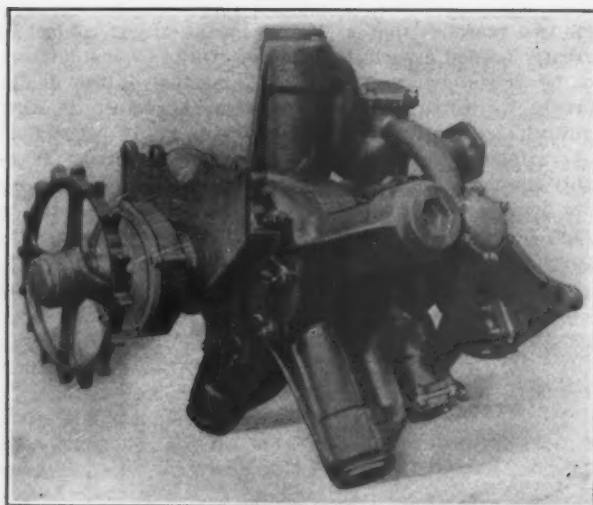


Fig. 3.—One of the Motors of the Manly Drive.

Fig. 2 shows an entirely similar apparatus set up on a stationary mounting for testing its efficiency. As it was impracticable to operate both motors in the test on account of the inability to adjust the braking action between the two sides so that either would remain constant, the motor for one side of the axle was removed and its pipe connections blank flanged. This was entirely allowable for purposes of a test, the other motor being compelled to take all of the discharge of the pump and affording an opportunity of making a much more accurate test. The pump was driven by an electric motor, the efficiency of which at various loads was known. The power input to the motor was obtained by reading a voltmeter and ammeter on the current supply, and the power delivered by the hydraulic motor was measured by the familiar Prony brake dynamometer. In these tests efficiencies were obtained ranging from $85\frac{1}{2}$ to $91\frac{1}{2}$ per cent., depending upon the ratio of speed change. Fig. 3 is a view of the removed motor and Fig. 4 a plan and elevation of a typical assemblage of parts on a motor truck chassis, in which *a* indicates the pump; *b* and *b* the motors; *c*, the pipe connections; *d*, *e* and *f*, respectively, the shaft, lever and controlling handle operating the change in the pump stroke, and *g* suggests the addition of a winch which may be driven by a third motor and used in loading the truck.

In designing this drive economy of manufacture has

been considered. No hand work or expensive finishing is required. All of the machined parts are finished in a lathe, and can be cheaply made in large quantities on turret machines. The assembling involves only putting together accurately machined parts. Compensation for wear was originally provided in all wearing parts, but the wear after a year's use has been found so slight that later machines have not been provided with wear adjustments.

In drives other than those for automobiles it will be usual to employ only one motor. A particular advantage in the transmission is the entire flexibility in the location of the motor with respect to the pump. It may be at any angle thereto, or at any distance from it within which it would be feasible to run the oil circulating main. In all of these applications as in the automobile, a single lever will furnish the entire control. This will be attached to the pump and so arranged that in its central position the motor will be stationary, the pump running idly with no stroke and discharging no oil, and moving the lever to either side of the center will give a constantly increasing speed in the corresponding direction up to the maximum. Where rapid changes of speed are necessary the control may be as rapid as desired; where accurate and minute changes of speed are necessary the adjustment of the control may be effected through a hand wheel, and where both minute and rapid changes are required at different times, the control may be effected by a hand wheel so mounted that slow adjustments will be made by turning it, and rapid adjustments by bodily moving it forward or backward. It is claimed that changes in speed may be made so rapidly from the extreme in one direction to that in the other and without shock, that a lathe can be reversed with perfect control while cutting screw threads to a shoulder.

In most cases the variation of the length of the stroke of the crank of the pump, especially if it is transmitting considerable power, would require excessive manual exertion on the part of the operator. Therefore, instead of having the operator do the actual work of adjusting the crank he merely has to move a control lever which is connected to a pilot valve. This controls the passage of a small amount of fluid from the main circuit of the pump into adjusting chambers, the pistons of which are connected to the pump adjusting mechanism. When the adjusting mechanism has been moved to the position indicated by the operator's control lever the pilot valve is automatically closed, thus blocking further changes in the position of the adjusting mechanism until the lever is again moved.

Labor leaders in England are attacking the copartnership scheme of Sir Christopher Furness, by which employees of a shipbuilding company are given an active share in the profits of the institution. They are of the opinion that the trade union rate of wages would disappear if there were many such schemes.

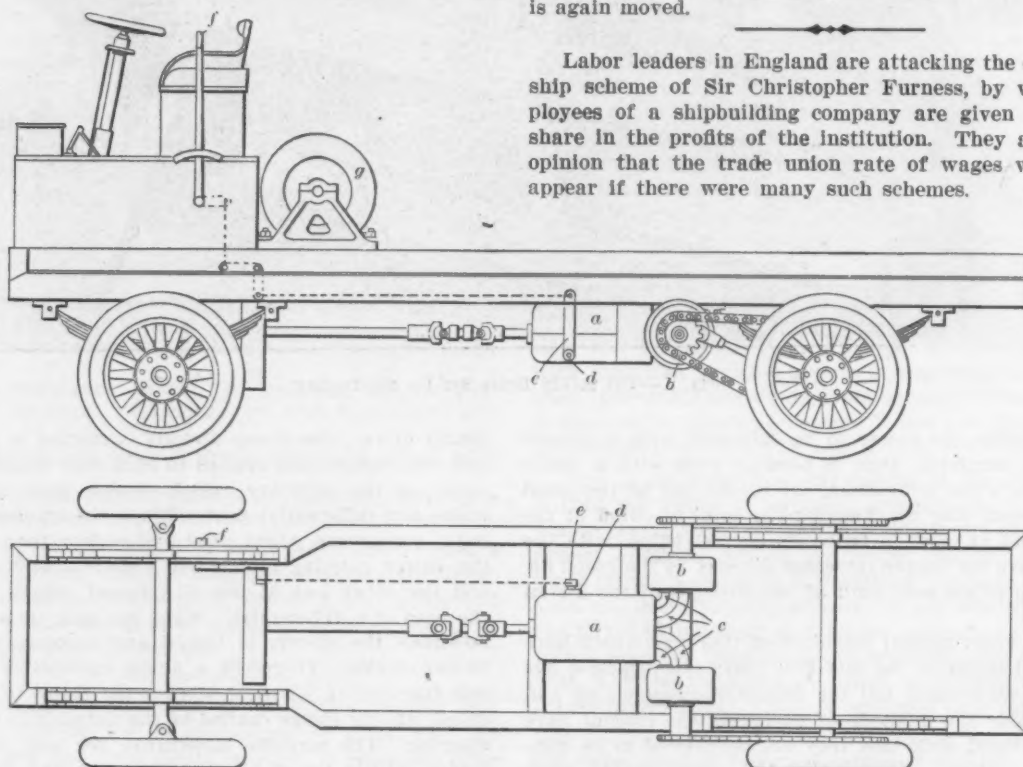


Fig. 4.—Elevation and Plan of the Plant for a Motor Truck Equipped with the Manly Drive.

TARIFF HEARINGS AT WASHINGTON.

Statements on the Metal Schedule.

WASHINGTON, D. C., December 8, 1908.—The Ways and Means Committee has taken action of much importance in connection with the pending hearings on the new tariff bill. It has been decided to extend the hearings until the 19th inst., and with a view to obtaining information which does not appear to be voluntarily forthcoming, Chairman Payne has secured the adoption by the House of a resolution clothing the committee with power to send for persons and papers, administer oaths and compel the testimony of reluctant witnesses.

This drastic action is the result of the failure of the leading industrial combinations to send representatives to Washington, and the inability of the committee to secure their attendance by invitation. The readers of *The Iron Age* are familiar with the attempt made by Mr. Payne to bring Mr. Carnegie before the committee, and with the correspondence given to the press in that connection at the time of the hearing on the metal schedule a fortnight ago. With the exception of the glass and paper industries, all the big combinations have either failed or refused to supply the committee with information either oral or written, and the members of the committee are smarting under the insinuations in the daily press to the effect that the so-called trusts are indifferent regarding the pending hearings for the reason that they expect later to bring influence to bear upon individual members of the committee through various underground channels. As a member of the committee has expressed it, "We will not sit quiet under the imputation that the smaller producer must come before our committee openly, while we provide a back door through which the trusts can conduct their negotiations." No programme has yet been arranged for the summoning of reluctant witnesses, and it may be that it will not be necessary to resort to extreme measures to secure desired information, but the committee is determined to obtain it. There are ample precedents for the punishing of recalcitrant witnesses by Congressional committees, and the developments promise to be exceedingly interesting if those who are summoned refuse to testify.

W. L. C.

Statement of H. E. Miles.

Interest in the metal schedule was revived before the committee on the 5th inst., when H. E. Miles, Racine, Wis., chairman of the Tariff Committee of the National Association of Manufacturers, appeared upon the committee's invitation, and attacked the methods of the United States Steel Corporation and of the large steel producers in general, declaring that the so-called trust was the creature of the Dingley tariff law, and that protection beyond a possible 15 per cent. ad valorem to prevent dumping in some lines was unnecessary. Inasmuch as the committee intends to use Mr. Miles' statement as the basis of inquiries which may embrace an effort to compel representatives of the big steel combination to testify, a brief extract from his evidence will doubtless be read with interest as follows:

Mr. Miles: Steel is produced as cheaply in the United States as anywhere in the world. I have figured costs for 25 years; I have figured with competitors by the dozen. If I know anything, I know how men can differ with one another about costs, and I know how impossible it is for any two men, seemingly, to arrive at the same conclusion as to costs unless they work together; and when one manufacturer denies another man's statement of costs, the denial may be right, because there may be an error; but even when both are right it is easy for them to some extent to question one another and to deny. But underneath all possible differences as to cost of production there is cost, and when you reach that general and fundamental proposition steel costs as little in this country as anywhere on earth. Judge Gray, appearing before the Committee on Merchant Marine, said he thought it cost a little less somewhere, and he made a guess as to the place. He is at the head of the United States Steel Corporation. Mr. Carnegie says it costs less. Mr. Carnegie's utterance of a few days ago was not merely a personal utterance. I have word from New York that it is the expression of the judgment of many steel producers. I cannot doubt it.

The Chairman: Will you give us the names of some of those steel producers, right there?

Mr. Miles: I expect to give you the names privately, if you wish them, but I would sooner not give them in public.

The Chairman: All right.

Mr. Miles: I do not know whether or not I should go back and tell what steel costs to produce, and what the price was to people like myself, intermediate consumers, when the Dingley law was formed, and how the Dingley law is in more or less degree responsible for an increase in the price to me of 100 per cent.

Mr. Underwood: If you do not give us that information, how do you expect us to be benefited by your talk? I hope you will give it.

Mr. Miles: Then I will go back and give you this about the United States Steel Corporation. I mentioned trusts, and just happened to pick this up first. Said Mr. Carnegie in 1884: "We are creatures of the tariff (meaning the steel people), and if ever the steel manufacturers here attempt to control or have any general understanding among them the tariff would not exist one session of Congress. The theory of protection is that home competition will soon reduce the price of the product, so that it will yield only the usual profit. Any understanding among us would simply attempt to defeat this. There never has been and never will be such an understanding."

Mr. Dalzell: Will you not give us the time and place where that declaration was made?

Mr. Miles: Andrew Carnegie, in the *American Manufacturer*, July 25, 1885. He was a poor guesser. Now as to the cost of ore, and kindly remember that I speak as a consumer, I do not wish to have to prove a perfect case that entitles me to keep my own money in my own pocket as against the steel trust. The burden of proof is upon the man who wants my money, under the ruling that he is entitled to it, to a certain exact and precise extent, being the excess in his cost of production over foreign cost. To that extent I hand him my money, and feel that I am well paid in doing it. I have a statement here from the man who consolidated the great ore properties in the Lake Superior District in behalf of the steel trust. Mining in that district is done mostly with a steam shovel. He said to H. C. Frick, of the Carnegie Company, July 25, 1897:

"As to the low cost of mining, although we are mining ore at present for less than 5 cents per ton for labor, we must look to the future when we will have to go deeper, pump water and lift the ore. Three steam shovels mined from its natural bed 915,000 tons of ore during the season of 1900, working 10 hr. a day only. Eight men with one shovel mined and laid into cars in one month, working 10 hr. only, 164,000 tons. A 25-ton car can be filled in 2½ min., being at the rate of 600 tons an hour. Water transportation is proverbially cheap, the cheapest in the world. From Lake Erie to Pittsburgh is the most efficient railroad in the world from a freight standpoint. It carries ore at the lowest possible cost, and with such connections with the ships that a train of 35 to 40 cars of ore can be loaded in an hour, and a 40-ton car of coal can be unloaded and partly trimmed in the ship in 36 seconds. All efficiencies from the ore in the dirt to the finished product at the mill are in line with this statement."

The great efficiency and low cost were well indicated by a letter of May 15, 1899, from Mr. Schwab, president of the Carnegie Company, to Mr. Frick, in which Mr. Schwab declared that rails were being made at \$12 per ton, as against \$19 cost in England. Said Mr. Schwab, "We can sell at this price and ship abroad so as to net us \$16 at works for foreign business, nearly as good as home business has been." What is true of rails is equally true of other steel products. With this cost they sold rails that year at \$16 to \$17 a ton and made \$20,000,000.

Mr. Dalzell: With whose authority do you state that there was ever such a letter?

Mr. Miles: Bankers and acquaintances in Pittsburgh, steel men everywhere, as far as I talked with them.

Mr. Dalzell: Suppose you name some of them.

Mr. Miles: I will give you the names privately, if you want them.

Mr. Dalzell: All right.

Mr. Miles: This letter has been public property for 10 years, and never denied. It is addressed to Mr. Frick, and a friend of Mr. Frick's told me it was all right in the particulars. All the statistics that can be gathered on the subject, so far as I know—and I have been at it for three years, and I will say nothing to you except as I got it from the most accredited experts of the United States on figures—the official valuation of all the steel property put into the United States Steel Corporation was \$400,000,000. They were thought to be worth \$600,000,000, or half as much

again, as soon as the consolidation was completed, because a trust can earn more money than competing institutions. That \$400,000,000, increased to \$600,000,000, was capitalized at \$1,450,000,000. It is fair to say just a round billion dollars of water, but that was all on the basis of competing conditions upon the various industries—various factories and mines—being worth what, for instance, my factory is worth, which is on a competitive basis; but the minute you added a monopoly control they were worth whatever the owners thought they were worth. To-day upon a close valuation, thanks largely to the Dingley act, not only has the water disappeared, but the property is estimated by Moody—and I think officers of the steel companies have published statements to the same effect—at net well above a billion and a half, notwithstanding hundreds of millions of dividends that have been paid out, as I remember; over half a billion of dividends and investments in the way of enlargements, and so forth. In those days, when we were all upon a competitive basis, I was buying steel at 80 cents per 100 lb. My stuff last year was made of steel that cost me \$1.60, or exactly double. *The Iron Age* about two years ago declared that the cost to the great steel companies was no more than when the trust was formed. That seems an impossible statement, but the truth about the steel companies surprises everyone. The steel people have gone over to England year in and year out for 10 or 15 years, and simply astonished the English producers with the record of their accomplishments. There is no question but the most remarkable accomplishments ever brought about in the manufacturing industry upon this round world of ours, the greatest of them all, is the accomplishment of the American steel producer; and, instead of speaking against the steel producer, we cannot speak highly enough of him, the greatness of character, and his intelligence and his accomplishment in his own industry. No Englishman who has listened to the stories that they have been glad to give them over there could think of competing with them.

Now, as to ore duties. The duty on ore is 17 per cent. I cannot say what ore is worth. It is as easily mined in this country as anywhere in the world, substantially.

Coming to pig iron, the wage cost at the furnace of making hot metal pig has been held up but recently, so far as I know, as high as 90 cents. The tariff is \$4. The wage cost in America is less than anywhere else I know. There may be pennies, 5 cents difference, something of that kind, but substantially nothing else, so far as I know. I get the cost from a producer who owns his mines, owns his furnace, owns his rolling mills, has the whole thing. He tells me that is full high. I get it from another man who builds furnaces and operates them. He tells me that is the generally accepted price in Pittsburgh. I have a statement, which I implicitly believe, to this effect, and I think it is a matter of general public record. Mr. Schwab, when called upon by Mr. Jenks and a committee of English steel producers in this country, took his cost books off the shelf and read as the entire wage cost at the blast furnace, hot metal, 41.1 cents per ton produced.

Mr. Underwood: If this only refers to the man in the stockhouse, where, as you say, the cost has been very greatly reduced by automatic lifts, I can see where the cost of labor in the stockhouse can be only 90 cents, but if you include in that the cost of transportation about the yards, the handling of the ore, the engine force and the great force of men around the yards, I cannot see where you can hold it at 90 cents, and all I want is information; I would like you to give me your authority for that statement.

Mr. Miles: I guess that would be included, sir. The total wage cost at the furnace is what a man who is worth \$50,000,000 and owns furnaces tells me.

The Chairman: In dealing with these subjects, the committee is dealing with important interests, and it wants to get at the bottom facts. It wants to know the whole business. It wants something that is at first hand, as far as it can get it. Whatever information you may give on this subject is not first hand. If you give us the source of that information, the committee may be able to find out just what the facts are, but the anxiety of the committee is to get the exact facts, the truth, and undoubtedly you state it just as it appears to you from all your information. If you will give us your sources of information, it will enable us to further investigate, perhaps.

Mr. Miles: I will do that. As a general proposition, with 90 cents or a little more, or, as Mr. Schwab would indicate, a good deal less, and with Mr. Carnegie's statement, and the statements of many other experts, many of whom I consulted, that it costs no less to make metal in this country than abroad, I hold \$4 to be a very excessive rate on pig. From the best figures I can get from producers—I have a letter not four days old wherein a producer checked my costs and said they were substantially right—I figure the cost of rails at \$14 to \$15. And to show how the trust operates, the trust makes the foreign price, if we can accept statements from the trade papers, of \$22 against the foreigner and \$28 against the home buyer. But to go on with my trust proposition. You have 40 per cent. tariff on pig, with a total of 28 per cent. on bars, 29 per cent. on

rails, 14 to 35 per cent. on steel ingots, 8 to 65 per cent. on sheet iron, and the wage cost averages on all those 15 per cent., according to the United States census.

Mr. Dalzell: Will you not give us the figures that the great producer checked off, and tell us who the great producer is?

Mr. Miles: Ten dollars on hot pig. Three dollars to the ingot; that is \$13. And \$2 as a full price to the rail. That is \$15.

Mr. Dalzell: Who was the producer who checked off those figures of yours and verified them?

Mr. Miles: Those are the names I will have to give you privately. I go to Mr. Schwab's letter as a check on the cost of rails—\$12 some 15 years ago, when they were sold for \$16—and my check gives the cost on bars as 80 cents, which, I think, recently cost me \$1.60. These things are all checked back and forth. Now, as to the need of protection. With a total wage cost on pigs, bars, rails, and ingots of 15 per cent., and a tariff which averages twice that, I cite the fact that they ship abroad \$46,000,000 of these cruder forms of steel, selling them in the open markets of the world, where there is no Dingley law to help them at all, but where, if tariffs are paid, they must be paid by the producer. I cannot imagine that it can be thought by any one that \$46,000,000 would be shipped out of this country into the open markets of the world by any producer who needed a protective tariff, and whose costs were excessive and above the costs in other countries.

The committee is in receipt of a number of briefs and informal written statements from prominent concerns in the iron and steel and allied trades regarding classification and rates of duty under the proposed new law. Some of the more important of these statements are presented below.

STEEL HARDENING METALS.

Statement of Susquehanna Smelting Company, Lockport, N. Y.

In presenting our application to you for amendment to paragraphs 122 and 183 of the act of July 24, 1897, we wish to briefly outline the history of the manufacture of ferrosilicon, upon which commodity we ask, in place of the present tariff of \$4 per ton, adequate protection to enable a manufacturer in this country to compete upon fair terms with the foreign imported material.

Ferrosilicon is a ferroalloy (an alloy of silicon and iron made in an electric furnace) upon which the tariff has been expressly fixed by Congress, act July 24, 1897, paragraph 122, together with ferromanganese, at \$4 per ton, whereas every other ferroalloy, such as ferrochromium, is at present appraised in the class of "metals unwrought," act July 24, 1897, paragraph 183, carrying a 20 per cent. ad valorem duty.

The use of both of these alloys by the steel makers is now large and increasing. We are not ourselves interested in the question of the duty upon ferromanganese and wish to submit no data for arguments upon this commodity. In the case of ferrosilicon, however, we wish to point out that the present conditions are essentially different from those that existed at the time that Congress passed the act of July 24, 1897. At that time it was represented that this commodity was a necessity to the steel makers, and there being no domestic industry involved, no injustice was done to a domestic industry by admitting this commodity practically untaxed. Since the fixing of this nominal tariff upon ferrosilicon, up to a comparative recent date, nearly all of the ferrosilicon consumed in this country has been imported from abroad, a fact that is clearly shown by the customs returns. During this period no serious attempt was made in this country to supply the domestic needs. Within the last two years, however, several manufacturers have turned their attention to the establishing of a domestic industry with a view to supplying the demand for ferrosilicon in this country, and, in addition to this, some works have been erected on the Canadian side, using Niagara power, in order to save the freight and transportation charges from Europe and be in close touch with the American market.

The points we wish to put before you relevant to Canadian competition are that our principal raw materials, namely, iron and charcoal, enjoy, respectively, a protection of \$4 per ton and approximately \$2 per ton, which means that to make one ton of finished product of ferrosilicon indirectly we pay \$3 duty on our raw materials and enjoy ourselves only \$4 per ton protection. To realize what this means it must be remembered that our chief competitor in Canada buys charcoal at two-thirds the price at which we can obtain it, and, using Government bounty fed power, obtains power, the principal item of cost in the manufacture, actually from the same company that supplies us, at a price fully 25 per cent. cheaper than we, with a most advantageous power contract, can buy it in this country. The additional points we wish to put before you relevant to competition from Europe are as follows:

It is well known that Norway, Sweden, and the Austrian

Tyrol are all abundantly supplied with potential water power developments, which, owing to the local conditions, are capable of extremely cheap development. It is claimed that in Norway and Sweden together there is easily 30,000,000 to 40,000,000 hp. which can be cheaply developed if required, and already some very big factories have been erected in both of these countries, where the cost of power is so low that processes can be carried on there commercially which it would be difficult to carry on even with Niagara power. It is claimed that horsepower in these two countries can be bought at \$6 to \$7 per horsepower year, and there seems nothing unreasonable in this assertion.

With reference to the Austrian Tyrol, from which district principally the ferrosilicon which has been imported into this country has come, we submit the following information in greater detail. In this district, without pretending to compile a complete list, we instance seven separate water-power companies, as below, of which the total horsepower capacity is in the neighborhood of 33,000.

	Horsepower.		Horsepower.
Innsbruck	6,500-13,000	Kardaum	2,000
Landecker Carbide.....	6,000	Etschwerke, Bozen and	
Brennerwerke Matred....	6,000	Meran	6,000
Brixen	2,700	Trient	1,000

In these works we have definite information that the cost of horsepower to the customer is between \$7 and \$8 per horsepower year, and that the customer pays for this power by contract upon terms which are more beneficial to him than the terms of power contracts common in this country. In addition to these concerns actually noted there is some 36,000 hp. generated in the Austrian Tyrol by plants of 1000 hp. and over. In Bosnia, too, one large works employs great quantities of power, probably as much as 20,000 hp. All of this power is available for the manufacture of electric furnace products, and will, when steel trade is busy, be largely employed upon the manufacture of ferrosilicon.

It is obvious that the European market will not absorb all the material so made, and the necessary result follows that in times of prosperity is this country the foreigner will dump his surplus make into this country, which to all intents and purposes, so far as this commodity goes, is an open market. It is well known that the surplus production of any industry tends to be dumped at an artificially low price in any free trade center of industry, and it is this unfair competition against which we ask adequate protection.

In addition to the extremely cheap power which these Continental countries enjoy, it must be remembered that the material so made is made by labor which is paid approximately upon less than one-third the scale of wages existing in similar industries in America. For instance, common labor in the Tyrol is paid at the rate of 5 cents per hour, superior labor at approximately 6 cents per hour, furnace men working on the furnace at 7 cents per hour, and competent foremen in charge at 10 cents per hour, whereas the scale of wages for men conducting similar operations in this country will be, respectively, 17½ cents, 20 cents, 25 cents and 30 cents. This is a direct consequence of the principle of protection, the benefits of which we do not ourselves yet enjoy.

To put the matter in a nutshell, it is certain from these two considerations alone that the foreigner is able to produce fully 25 per cent. cheaper than a manufacturer in this country.

We suggest that this is a case where a new American industry is in grave danger of being killed by foreign competition, and unfair competition at that, and it seems hard that American capital should be lost in an honest endeavor to establish an American industry to manufacture a product the use of which is now large and increasing and which is closely connected with one of the great industries of the country.

SILICON PIG IRON.

Statement of Colne & Co., New York.

We wish to place before your committee a few facts concerning the duty upon a certain quality of pig iron upon which, like all other pig iron, an import duty of \$4 per ton is imposed. This pig iron is used in making steel with the surface-blown converter, and analyzes as follows: Silicon, 2.25 to 3.50 per cent.; manganese, 0.50 to 0.90 per cent.; carbon, 3 to 4.50 per cent.; sulphur, 0.03 to 0.04 per cent.; phosphorous, 0.03 to 0.04 per cent. This iron is very scarce in the United States, the production small, the price high, and is confined principally in the hands of one house. This quality of iron could be imported from England at a reasonable price, lower than the American quality even with the addition of freight charges.

For the last 12 years we have been engaged in the business of putting up plants for making steel by the converter process, and though we have been able to develop it successfully to a certain degree, yet its wider extension has been very much hindered by the high price of the required pig iron. We have made efforts with several furnacemen to make this so-called silicon iron, but the demand for iron used in the open hearth process is so great that no one cares to divert from his regular work.

The surface-blown converter has proved its usefulness at the present time. It has been introduced with much success and advantage as an adjunct to cast iron foundries, malleable iron works and open hearth steel foundries. It fills a field not reached by the open hearth process for making small and medium perfectly sound castings of high tensile strength, free from blow holes. Steel is rapidly being substituted for cast or malleable iron. There is much demand for good castings from the machinery trade, steam fittings, electrical business, &c. The industries interested in such castings represent a vast amount of money interest, and anything that can be done to promote their success would be quite welcome. The surface-blown converter being now free, the patent having expired, it is to be presumed that its use will be largely extended, provided the duties now paid on the quality of iron needed will be lowered.

It has always been the policy of our Government to put on a very low duty or to enter free materials used by our manufacturers when they can not be procured at home. We bespeak, therefore, in the name of the machinery trade, the electrical business, growing so rapidly, the steel casting interests, and many other allied industries, a consideration at your hands, for lowering or taking away the duty on pig iron of the quality mentioned.

The thriving industry around and about Sheffield, England, is a striking exhibition of what can be done with the proper kind of iron where such is extensively used. By lowering or suppressing the duty on this high silicon iron you will not hurt any existing furnaces, as they do not make this brand of iron, and you will benefit all the industries mentioned. The iron could be imported upon analyses made on the other side and certified before our consuls.

ANTIFRICTION BEARINGS.

Statement of the Standard Roller Bearing Company Philadelphia.

Antifricition bearings are divided into three classes, comprising steel balls, ball bearings and roller bearings, and each item will be treated separately in the following, but the three classes of products are so closely allied that they are manufactured in this country very largely in the same factories, so that general remarks on the subject apply to all three of the products named.

There are engaged in the United States, in the manufacture of steel balls, ball bearings and roller bearings, several thousand employees, which number will be greatly reduced if the tariff is lowered. Heavy importations are made into the United States from foreign countries of steel balls and ball bearings, which are manufactured in foreign countries by the same classes of machines as are used in the United States, the machine being almost exclusively the product of American inventors and copied by the foreign users, and the use of which it has been found impossible to prevent through our patent laws. Owing to the very low labor costs in those countries, the cost of manufacture is much below what it costs to manufacture the same article in the United States.

I have made a personal investigation of the matter, visiting England and Germany during the present year, at which time I made a thorough investigation of the subject and found that labor, which is paid from 50 cents to \$1.20 per day in those countries, is the same class as is paid from \$2.25 to \$3.50 per day in the United States. The raw material from which their products are made costs approximately the same as with us, and as the machines used are the same and produce the same amount in a given time, they have a great advantage over the manufacturer in the United States because of their greatly reduced labor cost.

BALL BEARINGS.

At the present time there is very keen competition in the United States with ball bearings which are being imported into this country from England and Germany. The following list gives the prices at which the bearings are being sold in England and Germany and at which they are being sold in the United States, the article in each case being identically the same shape, size, weight, design, material used and construction, and alike in every particular:

England.	Germany.	United States.
\$1.44	\$1.50	\$2.25
1.38	1.44	2.13
1.62	1.68	2.49
2.04	1.96	2.92
3.84	3.84	5.76

The list I have given shows but five sizes, but there are approximately over 100 sizes, all showing the same relative difference. If the tariff is reduced it will be possible for the foreign manufacturer to send ball bearings into this country to such an extent that it will be unprofitable and impossible to manufacture here in competition with them, and the manufacture of these products in America will be discontinued.

The manufacture of ball bearings, referred to, is a new industry in the United States, having been established only three or four years, during which period a great increase has been made in the output, which, however, will cease entirely if the foreign bearings are brought into more active

competition than at present, as the margin of profit is not sufficient to admit a reduction in their selling price.

STEEL BALLS.

The foreign ball makers are securing some trade in America which would be greatly enlarged if the tariff on such products is not increased. The selling price in England, Germany and the United States for the same article, consisting of steel balls used on bicycles, sewing machines, &c., is as follows per thousand:

Size.	England.	Germany.	United States.
1/8-in.	\$0.35	\$0.35	\$0.50
3/16-in.	.59	.60	.90
1/4-in.	1.08	1.03	1.35
5/16-in.	1.89	1.80	2.50
3/4-in.	10.08	9.00	15.00

The greater portion of the cost of manufacturing steel balls and antifriction bearings is in the cost of the labor, a very small proportion of it representing the raw material used in the manufacture of the product. In the ball bearings above referred to the raw material, consumed in the manufacture of the product of the five sizes named is, respectively, as follows:

Size.	Cost of material.	United States selling price.
1/8-in.	Each \$0.27	\$2.25
3/16-in.	Each .16	2.13
1/4-in.	Each .26	2.49
5/16-in.	Each .29	2.92
3/4-in.	Each .71	5.76

For steel balls of the size referred to above the raw material or steel consumed in their manufacture is as follows:

Size.	Cost of material.	United States selling price.
1/8-in.	Each \$0.02	\$0.50
3/16-in.	Each .06	.90
1/4-in.	Each .15	1.35
5/16-in.	Each .30	2.50
3/4-in.	Each 1.30	15.00

It will be noted from the above lists that an average of less than 8 per cent. of the selling price of the ball bearings and steel balls is represented by the cost of the raw material used, the remainder being the labor cost, which is due to the fact that the product is one exceedingly difficult to manufacture, requiring great accuracy, in which highly skilled labor is employed, which results in the greatest portion of the cost of manufacture being for labor.

If the duty on the foreign product is reduced it will be impossible for the American manufacturer to remain in business in competition with the foreign product. The fact that the machinery and methods of making are identically the same in the foreign countries and in America shows conclusively that the higher wages paid the American workman adds so much to the cost that it would be impossible for us to manufacture in competition if the duty is reduced.

ROLLER BEARINGS.

The same general remarks apply to roller bearings as are made in reference to steel balls and ball bearings. The foreign makers have some slight advantage over those of the United States in the cost of their raw material, but because its value per unit of manufacture is very low, as is shown in the above lists, it is not a sufficiently large item to enable the American manufacturer to produce his product, if the tariff on steel was reduced to compete with the imported steel balls, ball bearings and roller bearings if a reduction was made in the tariff on steel.

If a reduction in the tariff was made and a corresponding reduction was made in the selling price of the products above enumerated, there would be no corresponding advantage to the individual consumer, while all cost of the change would have to be borne by the American laborer, who would be unable to secure employment at the present existing wages.

The difference to the consumer if the tariff was entirely removed would be exceedingly light. Steel balls, for instance, 1/8 in. size, sell in the United States at 50 cents per thousand, or 5 cents per hundred; the foreign prices are 35 cents and 3 1/2 cents, respectively, or a difference of 15 cents per thousand and 1 1/2 cents per hundred between the foreign and domestic prices. Such balls are used on bicycles, sewing machines, &c., in which from 10 to 25 balls are used in each article. Therefore, if the tariff was removed entirely the difference in the cost of the finished article to the American manufacturer of bicycles and sewing machines would amount to from 2 mills to 4 1/2 mills, or less than 1 cent on the finished article.

For 1/4-in. balls the differences in prices is 33 cents per thousand, or 3 3-10 cents per hundred, making a difference to the consumer between the foreign and domestic prices of 3/4 cent to 1 1/2 cents for each bicycle, sewing machine, &c., on which they are used.

For ball bearings the difference in price for the average size is from 75 cents to \$2 each. These bearings are used on automobiles, &c., where the difference in the cost of an automobile to the consumer would be from 75 cents to \$8 each if the tariff was entirely removed.

Analysis of the above shows that the saving that would result, even if the duty was entirely removed, is as follows: On sewing machines, bicycles, &c., according to the size used,

2 mills to 1 1/2 cents each; automobiles, 75 cents to \$8 for each automobile.

The same remarks apply to steel balls, ball bearings and roller bearings used on various other products, as in no case is the value large of the balls or bearings so used, and a reduction in price, which would result from a reduction in the tariff, would give no material or compensating benefit to the consumer; while, on the contrary, labor now receiving high rates of wages from the American manufacturers, amounting to \$1,500,000 to \$2,000,000 per annum in the total wages paid would be very largely out of employment in this particular business or would be forced to accept greatly reduced wages in order to permit the American manufacturer to continue manufacturing his product.

Freight rates have very little bearing upon the subject, as they amount to but little and do not exceed 5 per cent. and usually less on a majority of products referred to above.

As in all other products, the use and consumption of steel balls, ball bearings and roller bearings is limited, and if the tariff is reduced the foreign product will be imported at no benefit to American industry. On the contrary, the foreign manufacturers will be able to increase their force of employees in order to supply the demand for their products in the United States, and for which they will give no corresponding benefit. It will foster and develop the business of sponding benefit. It will foster and develop the business of the foreign manufacturer at the expense of the American manufacturer and laborer and enable them to send their product into this country, thereby reducing the number of employees now engaged in the business in the United States, in addition to which it will draw from this country a large sum which will be paid to the foreign manufacturers for their product, covering their cost and their profit, all of which would be expended by the foreign manufacturers in their own countries in the purchase of raw materials and supplies, also the payment for their cheap labor, producing no corresponding advantage to the consumer in the United States.

CUTLERY, SAWS AND TOOLS.

Statement of the Harrington Cutlery Company, Southbridge, Mass.

Concerning the Harrington Cutlery Company, Southbridge, Mass.: Capital stock, \$30,000; number of hands, 50; wages and salaries, \$30,000; sales at home, \$60,000; sales abroad, \$4000; originally established in 1818; continued by individuals and partnerships (in Harrington name) in a small way until 1902, when present company was incorporated; growth at present being very rapid.

Schedule C, paragraph 155, interests us, and we very strongly urge that the present rate be maintained in order that we may continue the present standard of wages. Some grades of cutlery manufactured by us would be entirely eliminated should the rates on them be reduced.

Statement of E. C. Atkins & Co., Indianapolis, Ind.

English manufacturers are to-day underselling us in export markets, and they will continue to do so owing to the large difference in the cost of manufacture abroad and in our own country. If the tariff should be revised in our business the foreign manufacturer would then enter our own market, and between the two evils, namely, our inability to compete with them in foreign markets on the one hand, and their ability to compete with us in our own market on the other hand, we would much prefer the present state of affairs.

In the second place, there are large saw manufacturers in Canada, and the duty on our goods into Canada is 30 per cent. ad valorem on the whole line. If the tariff should be changed it would allow Canadian manufacturers to come into our markets and undersell us right away. This we would not consider advisable. Such a condition of affairs would mean material reduction in cost of manufacture, which would mean reduction in wages and the earning power of our workmen.

In the third place, Sweden is now sending in crosscut saws notwithstanding our duty of 6 cents per foot, proving beyond question that our duty on saws is not prohibitive as it now stands.

In the fourth place, we want to call your attention to the difference in the cost of labor here and abroad as it applies to our own business. Saw smiths are earning to-day in the United States from 40 to 50 cents an hour, abroad from 20 to 25 cents, other labor in proportion.

We also want to say that a comparison between the Dingley tariff and the Wilson tariff shows no change in the charges on products of our factory. The Wilson tariff was supposed to be a tariff for revenue and not, in the strictest sense of the word, a protective tariff, and in no respect is the tariff on saws prohibitive.

Statement of the L. S. Starrett Company, Athol, Mass.

We are manufacturers of fine tools and are exporting them now, having a warehouse and office in London. In our experience, the Germans are our worst competitors. They have imitated our improved tools that we have gotten up and patented in this country and would have patented in

foreign countries but for unfavorable discriminations existing against us in the foreign patent laws. The Germans are duplicating tools that we originated, making them more cheaply, sending them into this country and underselling us. The English are also now copying and manufacturing our tools. One of our agents a few weeks since, finding imitations of certain of our tools among the hardware trade, inquired why they did not patronize home production rather than pay duty and sell the German make. The reply was that they could pay the duty and make more on the imported goods than on the home production. For this reason you will see the advisability of keeping up the tariff on goods in our line. We are at present employing between 600 and 700 hands, and are hoping later on to employ twice as many, and shall be able to if we have suitable protection. Therefore we would advise that the present tariff be maintained on goods in our line, but on raw material, such as we use in steel tapes, hack saw blades, &c., we should hope that the duty might be reduced.

We are going to say that the recent change in the patent laws in England discriminates against us more than ever heretofore. As it is now we are not only required to pay exorbitant rates for protection in taking out a patent, while we get none, but are obliged to have the article manufactured in England, as well as France and Germany, in order to maintain the validity of the same. This is a matter, however, that should be brought before those interested in amending the patent laws.

ENAMELED WARE.

Statement of the Stewart Company, Moundsville, W. Va

We wish to speak with reference to the duty on enameled ware included in article 159, under Schedule C.

We are not manufacturing the so-called "American granite and agateware," but are confined exclusively to white lined or porcelain lined enameled iron and steelware. Our competition comes directly from German manufacturers. The brands against which we have to contend are known to the trade as "Stransky steelware," "Pyrolite enamelware," "Elite enamelware," and other well-known brands, all of which are manufactured in Germany and at least one of which is found in almost every good department store and retail hardware store in the country.

We have invested in the business here in West Virginia \$450,000, and are doing a business in this city alone of \$800,000 per annum. We claim and believe that we are manufacturing ware equal in quality to that made in Germany, but we are not holding our own with the foreign ware, importations of which are steadily increasing. It is not because we do not understand the business in which we are engaged, nor do we think that a higher rate of duty than 40 per cent. is necessary, but we attribute our difficulties:

1. To a distinctive finish that comes of a superior technique or a delicacy of workmanship that has been acquired by the Germans through generations of experience.

2. A disposition on the part of the American consumers to give the preference, at equal prices, to any class of goods that bears the magic word "imported" or "made in Germany."

3. And most serious of all is the unfair advantage taken by the importers of German goods whereby the duty of 40 per cent. is in effect greatly reduced on all articles, and on some articles it is cut in two. We refer to the fact that an importing house in New York, owning its own enamelware factory in Germany and manufacturing exclusively for itself, can and does consign its product of the German factory to its distributing house in New York at valuations that have no reference to cost of production and bear no relation to the price at which the goods are to be sold in this country. The mere fact that their values are not sworn to and are not open to correction by the customs officials at the port of entry is an invitation to perpetrate a fraud on the Government, and the growth of the importations is an evidence that the importers are taking advantage of this weakness in the administration of customs.

4. Again, taking advantage of that clause referring to unfinished goods, the importer has certain goods consigned to him as unfinished goods, admitted under a lower rate of duty, certain articles such as coffee pots in one shipment, unfinished because without covers, and covers in another shipment, unfinished because without pots, both of which articles become finished when the cover is put on the pot after passing the custom house. Other articles requiring bails continue to be unfinished goods until after the bails are affixed in this country.

5. We submit that this mode of procedure defeats the will of Congress, deprives the Government of its fair revenue and brings to us unfair competition. Whatever may be said of the grosser forms of steel manufactures, this line of business is emphatically an infant industry that needs and must have protection.

As stated, 40 per cent. ad valorem properly administered is sufficient, but we would like to see the frauds perpetrated through the unfinished clause done away with by abolishing that clause, and we would like to see 40 per cent. duty as-

essed upon valuations that bear some relation to the price for which the goods are going to be sold in this country, since it is impossible to ascertain the true market value of goods in Germany of which 90 per cent. is manufactured for export. The insignificant 10 per cent. can be and is sold at a very low price in Germany to fix a valuation for the 90 per cent. that is exported, and even the 10 per cent. would not be selected goods.

We suggest that a lower rate of duty than 40 per cent. would be more real protection if based upon values in New York than in Germany.

We are convinced that, unless these abuses that have grown up quite recently are not remedied now, the outlook for the American manufacturer of enameled ware is very dark indeed.

FIREARMS.

Statement of the Hunter Arms Company, Fulton, N. Y.; Ithaca Gun Company, Ithaca, N. Y.; Parker Bros., Meriden, Conn.; Lefever Arms Company, Syracuse, N. Y.; J. Stevens Arms & Tool Company, Chicopee Falls, Mass.; N. R. Davis & Son, Assonet, Mass.; and Baker Gun & Forging Company, Batavia, N. Y.

In reference to the hearings now being held before your honorable committee upon the subject of tariff revision, we, manufacturers of double-barreled breech-loading sporting shotguns, representing a large majority of those actively engaged in such industry in the United States, do urgently petition that the present Dingley tariff, act of July 24, 1897, in so far as it affects such arms and parts thereof, be maintained without change for the following reasons:

1. Notwithstanding the protection afforded this industry by the Dingley schedule there have been imported into this country during the 10 years since it went into effect until June, 1908, 1,144,361 double-barreled breech-loading shotguns, which come directly in competition with those manufactured in the United States.

2. By reason of the protection afforded under the present schedule we were encouraged to increase our capital investment, enlarge our facilities, increase the volume of our output, and thereby reduce the selling prices to the consumer.

3. Our cost of labor has been increased 20 to 25 per cent. on account of the general prosperity and increased demand for labor in the metal working industries generally under the present tariff.

4. We desire also that the present tariff on component parts of such guns, as well as on the finished guns, be maintained lest, as in former years under a previous schedule, such guns be imported in parts and assembled after passing the customs free, thus evading the duty, which defect and abuse of the principle of the law has been corrected by the present tariff act.

5. A manufactured gun is more than 80 per cent. labor. In this industry our labor costs three times that of the same class in foreign countries.

6. We further request that shotgun barrels in single tubes forged rough bored and gun blocks for gunstocks rough hewn or sawed or planed on one side, be continued on the free list as at present, because their manufacture or production can not be economically undertaken in this country.

7. While the protection afforded under the present schedule has enabled us to partly hold our home market we have not been able to meet foreign competition in any neutral territory.

8. A double-barreled breech-loading shotgun is a luxury, and every argument to be urged in favor of a protective tariff applies with the greatest force to an industry of this character.

9. The manufacturers of double-barreled breech-loading shotguns are not in any trust, combination or agreement, either expressed, implied, secretly understood or otherwise, for any purpose and never have been. The purchaser, therefore, receives the benefit of the lowest price at which our product can be manufactured and sold in open competition.

In reference to the testimony of Joseph Gales, importer, introduced at this hearing, we beg to state:

That the said importer is of the firm or company of Schoverling, Daly & Gales of the city of New York, engaged in the business of importing and interested in the production of certain foreign made double-barreled breech-loading shotguns known as the Sauer, Daly and Stake guns, and others.

The reduction of imports according to the figures submitted by him are misleading as to arms of this class, included as they are in the totals of all classes of arms and parts thereof in said figures.

Statistics from the Government reports show the total importations of double-barrel shotguns during the first year of the operation of the present tariff act to have been 49,733, and in 1907 (ten years later) 44,185, a comparative decrease of only 11 per cent.

The fact that American double-barrel shotguns are sold at prices ranging from \$8 to \$500 further refutes the statement of said importer that they do not compete with all grades of foreign made guns.

The importer states that four new factories have been

started for the purpose of manufacturing firearms in this country. If this is true, it is also true that foreign and domestic competition have resulted in the lowering of prices of double-barreled shotguns to such extent that a larger number of such factories have discontinued.

Without increased cost to the consumer, the American manufacturers of double-barrel guns are now furnishing guns better in quality than ever before. To meet the demand for medium and low priced guns, new grades have been established at prices 35 to 50 per cent. lower than the average prices prevailing when the present schedule went into effect.

While we have not asked for an increase, we assert that the maintenance of the present tariff rates on double-barrel sporting breech-loading shotguns is absolutely necessary to the existence of this industry.

GUN SHELLS.

Statement of Fred Biffar, Chicago, Ill.

I would like to call the attention of your committee to the fact that paper shotgun shells, sometimes known as "paper shotgun cartridge cases," are not specified in the Dingley bill, consequently they come in as manufactured articles. The component part is chiefly brass and carries a duty of 45 per cent. ad valorem, and if you will have the records looked up you will find there has been scarcely any of these goods imported for the reason that 45 per cent. is a prohibitive tariff.

I am sending you under separate cover a sample of imported paper shotgun shells, and will state that I would like to import these goods and load them here with powder, wads and shot, but under the present rate of duty I cannot do so, and I must depend on American manufacturers for supplies of these goods, and the same manufacturers may cut off my supply at any moment leaving me with machinery for doing this work that will be useless.

I would be glad to go to Washington and present this case to you in person, but the amount involved would be trivial as compared with subjects you are now handling, for as a matter of fact I think I could import about 2,000,000 of those shells per year, and the average price per thousand shells should be approximately \$4 per thousand or a gross sum, say, of \$8000 per year, and I would recommend that these shells be put either on free list or if the Government could reap a benefit from this business I should recommend 10 per cent. ad valorem, not to exceed 20 per cent. ad valorem, or a flat rate of, say, \$1 per thousand if you prefer to put it that way.

The shells are described "primed empty shotgun shells" or "primed empty shotgun cartridge cases." The latter is the term used in Europe more frequently and the former is the term used in this country most frequently.

The above items could consistently be added to paragraph 424 under the title of explosive substances of the Dingley bill.

I think you will find the only shells now imported are pin fire—not made in this country.

TEXTILE MACHINERY.

Statement of Robert F. Herrick and Others.

As president of the Lowell Machine Shop, and on behalf of a committee representing the principal manufacturers of textile machinery in this country, I desire to submit to you a brief statement showing why the duty on imports of this character should be maintained at least the present rate.

Machinery of this description is now and has been in the past included in the general paragraph at the end of Schedule C—in the present tariff paragraph 193, "Articles or wares not specially provided for in this act, composed wholly or in part of iron, steel, lead, copper, nickel, &c.," on which is imposed a duty of 45 per cent. ad valorem.

We do not ask to have this rate increased on textile machinery, but we submit that the rate should remain unchanged in the new tariff. We understand that the platform of the Republican party as adopted in Chicago and as interpreted in the speeches of the President-elect in respect to revision of the tariff, contemplates that the new tariff shall impose "such duties as will equal the difference between the costs of production at home and abroad, together with a reasonable profit to American industries."

If the rate of duty on textile machinery is reduced from the present rate, it will be in violation of this portion of the Republican platform. The only foreign country engaged in the manufacture of this form of machinery to any appreciable extent is England. England does more than three times as much textile manufacturing as the United States, and manufactures much more than three times as much textile machinery as the United States. The shops for the manufacture of textile machinery in England have been established for generations, and several of them are many times larger than any of the American shops. They are abundantly supplied with capital, and the cost of their plants is probably not greater than 60 per cent. of the cost of the plants in America. Competition with this country in the manufacture of textile machinery always has been and still

is keen, and while the large proportion of the cotton machinery used in this country is made here, a substantial amount of it is still imported. Most of the worsted machinery used in this country is imported from England, though the American shops are making year by year a better product and are gradually gaining in this branch of the business.

The capital employed in the manufacture of textile machinery may be roughly estimated at approximately \$40,000,000, and the number of men employed at, say, 20,000.

Prior to the Wilson tariff the rate of duty was the same as it is now—45 per cent. The Wilson tariff reduced the duty to 35 per cent., and the present tariff restored the rate to 45 per cent. in 1897.

The reports of the Bureau of Statistics show a steady gain in importations of machinery from the United Kingdom during the present tariff. In 1897 such importations amounted to only \$945,380, whereas in 1907 they amounted to \$2,845,357. Our own investigations at the port of Boston tend to show a similar increase. Our estimate of the importations of textile machinery in Boston alone show a gain from \$850,850 in the year 1898 to \$2,113,528 in the year 1907.

There have been no exports of American made textile machinery except in isolated cases where the foreign manufacturer was anxious to try the higher priced American machinery on account of certain special or patented features. There is absolutely no such thing as competition abroad between American made machinery and English made machinery. This is not because of superior quality in the English machinery, but simply because the English manufacturers can afford to sell and do sell and make a profit at prices which would not repay the American cost.

PLATINUM.

Statement of J. Bishop & Co., Malvern, Pa.

The undersigned respectfully petition and invite your attention to paragraphs 641 and 642 of the tariff law of 1897, admitting platinum, either manufactured or unmanufactured, duty free.

We ask that part of paragraph of 641, relating to platinum in sheet and wire and all of paragraph of 642 be stricken from the free list, and that a duty be placed on these items of at least 25 per cent. Our claims for asking this duty are based on the following:

1. That owing to the cheaper labor cost European manufacturers are enabled to sell platinum for chemical purposes, such as vases, retorts, crucibles, dishes, wire, foil, &c., at a lower price than they can be made for in this country.

2. We ask that as manufacturers of such apparatus we be given a certain amount of protection, the same as other manufacturers of chemical and scientific apparatus, thereby giving a larger field of employment for skilled American labor, and enable us to pay higher wages than can now be done.

3. Our ability to meet the demands of the users of this material is unquestioned. The first platinum works in the United States was established by the founder of these works, Joaquin Bishop, in 1842, and the process first used by and original with him in melting and manufacturing platinum for chemical, dental, jewelry and other purposes was adopted by European manufacturers.

4. That the only other works in the United States claiming to manufacture a line of platinum for chemical purposes besides ourselves is controlled by a European company, which in turn is associated with what is commonly known as the "platinum syndicate," composed of English, German and French manufacturers, whose product is sold largely in the United States. Under the existing tariff it is possible for this company to import platinum chemical apparatus, either wholly or partly manufactured, and sell it as of American manufacture.

The only way we can meet this competition is by having a duty placed on manufactured platinum for chemical purposes consisting of crucibles, dishes, retorts, wire, foil, sheet, &c., thereby giving larger employment to American labor and encouraging manufacturers in this country independent of European control.

5. That the United States Government in its various departments purchases platinum in manufactured form, much of which is of foreign manufacture, and all of which could be made in this country of as fine quality and workmanship if given moderate protection.

6. Your attention is called to paragraph 193 of the tariff law of 1897, which places a duty of 45 per cent. on all articles made wholly or in part of platinum not otherwise provided for in this act, and we claim that there should be no distinction made in platinum for chemical purposes.

7. Platina or platinum unmanufactured, consisting of ore or in bars or ingots not less than 1/8 in. thick, we ask be admitted free of duty, as under the existing law, as the domestic supply of crude platinum is so small as to be a negligible quantity, the Russian mines furnishing the principal supply.

Platinum ingots as imported into the United States are approximately 5-16 in. thick by 2 to 4 in. wide, and weigh about 100 troy ounces each.

MACHINE TOOLS.

A very influential representation of the machinery trade, including prominent members of the National Machine Tool Builders' Association, has presented a brief recommending the establishment of a maximum and minimum tariff on machinery, which would be in effect a reduction. The retention of the present duty of 45 per cent. ad valorem is advocated as the maximum rate, in combination with a minimum rate of 30 per cent. for those countries which come under the favored nation clause.

The original brief was prepared and signed by the committee of 12 appointed by the National Association to appear before Secretary Straus of the Department of Commerce and Labor to urge the continuation of the investigation of conditions abroad in their relations to the machinery industry, as begun by Capt. Godfrey L. Carden. The committee was in Washington last week, and it was suggested that advantage be taken of the gathering to present the views of the industry to the Ways and Means Committee. The time allotted to the tariff on machinery had passed, but it was arranged that Chairman Payne would give the members a private hearing at the close of one of the day's sessions. It happened, however, that adjournment on the day in question was not until a very late hour, and consequently, upon the suggestion of Congressman Hill of Connecticut, it was decided to submit the views of the trade in the form of a brief. The document does not go into details and statistics of the machinery business, but is a comparatively short recommendation of the establishment of the minimum rate, as stated. It was signed by 10 of the 12 members of the committee, as follows: Fred L. Eberhardt, Gould & Eberhardt, Newark, N. J., president of the National Machine Tool Builders' Association; Murray Shipley, Lodge & Shipley Machine Tool Company, Cincinnati, Ohio; H. L. Flather, Flather & Co., Inc., Nashua, N. H.; C. H. Alvord, Hendey Machine Company, Torrington, Conn.; F. A. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio; A. T. Barnes, W. F. & John Barnes Company, Rockford, Ill.; J. B. Doan, American Tool Works Company, Cincinnati, Ohio; P. E. Montanus, Springfield Machine Tool Company, Springfield, Ohio; C. A. Johnson, Gisholt Machine Company, Madison, Wis., and W. P. Davis, Davis Machine Company, Rochester, N. Y. Of the two other members of the committee, W. R. Warner, Warner & Swasey Company, Cleveland, Ohio, favors the ideas set forth in the brief, but was compelled to leave Washington before it was completed, and E. M. Woodward, Woodward & Powell Planer Company, Worcester, Mass., while strongly in favor of the change as suggested, preferred to wait until the matter could be brought before the manufacturers of the Worcester District and act with them. A meeting was called at Worcester later in the week and a brief containing practically identical views was prepared and signed by a large majority of the trade of Worcester and Fitchburg and forwarded to Washington.

The argument of the machine tool builders is that it is only just to foreign builders and customers that the American machinery industry be placed in a position of reciprocal tariff relations under the favored nation clause. There is at present little demand for foreign built machinery of the standard types in the United States, though certain special tools are imported to some extent. The American industry feels that it should recommend a maximum and minimum rate that it may participate in the reduction which goes with reciprocal tariff relations. Under existing treaties, practically the entire foreign machine tool industry is included in this class. Naturally the effect of such a decrease should be felt abroad in the way of an increase of friendly feeling not only on the part of machinery builders but of buyers as well.

The committee of 12 was given a hearing by Secretary Straus and urged the continuing of the investigations begun by Captain Carden. The members pointed out that this work could not be accomplished so satisfactorily by a representative of the Machine Tool Builders' Association as by an official representing the United States, who would be given greater freedom of access to works and records, and consequently would be able to get at a much more intelligent and comprehensive idea of the kind of facts that would be of advantage to the American industry. Secretary Straus took the matter under advisement.

BAR IRON.

James Lord, president American Iron & Steel Mfg. Company, Lebanon, Pa., has filed the following supplementary statement with the Ways and Means Committee:

On the 25th ultimo I addressed your committee in reference to paragraph 123 of metal schedule of Dingley tariff, which states the duty on bar iron as 6-10 cent per pound.

As the events of the year have clearly indicated that we are to have a new tariff law, revised along lower rates of duty, a meeting of iron and steel manufacturers was held in New York on the 23d ultimo to consider the situation and present their views before your committee. I was designated by them to speak on the above item. The sug-

gestion of reduction of the tariff on bar iron from 6-10 to 5-10 cent per pound was made after consultation with as many bar iron interests as the limited time permitted. I have since written to all the manufacturers whose addresses could be procured, except those on the Pacific Coast, and have received 30 replies, representing the great majority of the tonnage produced in the United States.

While the preference of an overwhelming number would be to make no change, and thus avoid the disturbance to business consequent upon tariff revision, 25 of the 30 recognize the inevitable by indorsing the suggested reduction as above stated; five wish to be counted as greatly opposed to any reduction whatever.

In comparing the duty on iron bars with steel bars, it should be remembered that the former carry a much higher labor cost, as steel bars are rolled with automatic mechanism which cannot be applied to iron. And it should be remembered that during this period of great depression wages have to a remarkable extent been maintained and in no case have I heard of any considerable reduction of wages in this industry.

The brief submitted by James H. Nutt shows that the wages paid for puddling in Great Britain is less than half the American rates. It is in order to continue the wage of labor at the present remunerative rates that manufacturers are so interested in not reducing the duty below 5-10 cent. I believe that amount is needed as a tariff on labor.

If bar iron was put on the free list, it would still be manufactured in this country, but it would be at the expense of labor whose wages would necessarily fall to the level of the competing countries—Great Britain, Germany and Belgium.

The ordinary refined iron of commerce (when partially made from scrap material) is now sold at from \$1.35 to \$1.50 per 100 lb., the quality determining the difference between these rates. The average profit to the manufacturer at present is about \$1 per ton or less. The labor cost in making iron bars is about one-third of the total cost where scrap is largely used; if all muck bar is used the labor is greatly increased. The price of refined iron bars in England November 1 was \$29.84 per gross ton, on cars at the mill, equivalent to 1.33½ cents per pound.

A number of manufacturers have requested me in presenting this brief, to advocate much lower duties on iron and steel scrap. I will, however, merely state conditions. The demand for this scrap material has been greater than the visible supply, due in part because it has been largely held by speculative dealers. Canada puts a practically prohibitive duty on iron and steel bars, but only a nominal duty on scrap. Consequently that country can feed her mills with our scrap, while our mills cannot sell them manufactured bars.

The Largest Chimney in the World.—A chimney of unprecedented size, built at the smelter plant of the Boston & Montana Consolidated Copper & Silver Mining Company, near Great Falls, Montana, is described by the *Engineering News*. It is 506 ft. high above the top of the foundation ring and 50 ft. in interior diameter at the top. It is the highest in the world by about 40 ft. and the highest in the United States by 140 ft., the Eastman Kodak chimney being 366 ft. high, and the Orford Copper Company's chimney 365 ft. The weight of the stack is between 17,000 and 18,000 tons. Its discharge capacity is 4,000,000 cu. ft. of gases per minute, with a draft of 3¼ in. water expected with gases at 600 degrees F. average. The height was governed solely by the draft requirements and not by the desideratum of discharging high enough in the air to prevent creation of a nuisance. This latter requirement is met by the existing stack, which is but 186 ft. high, the city of Great Falls being 500 ft. lower than the tableland and the valley bottom 250 to 300 ft. lower.

The first Schlick gyroscopic apparatus made in England for preventing ships from rolling at sea has been constructed at the Neptune Works of Swan, Hunter & Wigham Richardson, Ltd., Newcastle, and has been fitted in the steamship *Lochiel*. The apparatus can be thrown in or out of action at will. When out of action the *Lochiel* rolled to angles of 16 degrees on each side—that is, the total angle of roll was no less than 32 degrees—and when the apparatus was put into action the rolling was decreased to a total angle of roll of from 2 to 4 degrees. The gyroscope on the *Lochiel* is driven electrically and needs little attention. It requires but little space in the steamer, as the design has been simplified and is now very compact.

THE IRON AGE

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						HARDWARE EDITOR.

Regulation of the World's Export Trade in Iron and Steel.

The effort now being made at Washington, with no close approach to success, to grasp some of the main facts concerning international competition in iron and steel makes timely a paper recently prepared by Harold Jeans, editor of the *Iron and Coal Trades Review*, London, England, for the Staffordshire Iron and Steel Institute. It is entitled "The World's Export Trade in Iron and Steel and Its Regulation." While dealing chiefly with the first part of his subject, Mr. Jeans has developed it all with reference to its bearing on the possibility of international regulation. Indeed, on the second page of his pamphlet of more than 30 closely printed pages he introduces a part of the address made in London in September last by Judge Gary, chairman of the United States Steel Corporation, before prominent representatives of the steel trades of Great Britain, Germany and France. The keynote of that address was contained in the sentence, "The manufacturers of iron and steel in all countries should be working together with and for one another." Judge Gary's proposal that in connection with the export iron and steel trade of the leading iron producing countries there should be "a committee composed of men whose advice should always be followed" is taken by the writer of the paper to point to "a board of directors, the members of which are to be elected as representing the various countries concerned, the majority of which shall be able to fix the prices at which each buyer shall obtain his material and from whom he shall buy it." Whether the very definite construction contained in these last two lines was intended by the maker of the London address may be questioned; but there can be no mistaking its general tenor or its advocacy of measures of practical co-operation to do away with the profitless selling of iron and steel in markets far distant from the point of manufacture and naturally tributary to the plants of other manufacturers.

Two lines of inquiry are followed in the paper, in considering the possibility of international regulation; the first deals with internal conditions in the iron trade of each country, and the second with the nature and extent of the export trade in iron and steel. The facts involved are by no means few or simple. Yet the writer finds that conditions have been shaping themselves in various countries so that an international understanding is more easily possible than ever. Since production must be on a large scale to pay, capital cannot be had for iron works in remote parts of the world. The export trade, therefore, has been largely carried on by four countries—

Great Britain, Germany, the United States and Belgium. France has a smaller trade, but it is mainly just across her borders or with her colonies. Sweden has a small trade in specialties, and Austria, Russia and Spain appear but spasmodically in international competition.

Passing to consider the status of the domestic iron trade in each country, the paper takes up the United States first. It is argued that overcapitalization of large producers will not prevent the export of American steel at low prices, but public opinion in the United States is regarded as the most powerful deterrent of a policy of dumping abroad, accompanied by such price maintenance at home as has marked the past year of depression. The interesting statement is repeated from the report of the United States Steel Corporation for 1907 that "the average mill price per ton received for all exported materials in 1907 was [but] 7½ per cent. less than the average price for the home trade." How little the export trade amounts to for American works, in comparison with their home trade, has been a matter of frequent comment. The paper puts it well by saying that the falling off in our home trade in iron and steel this year, from either 1907 or 1906, represents a larger tonnage than a year's iron and steel exports of all countries. It is intimated that future competition from this country in international markets may come from the Atlantic seaboard, where the price of Cuban ore, supposing the duty on ore removed, is put at \$1 a ton, a figure well below anything possible now, even with the duty counted out. Then taking up Germany, the paper describes the syndicate operations there, which are now quite familiar. It points out how the British market has acted to an extent as a safety valve to German trade, having contributed to the stability of the syndicates, which are partly able to compete in oversea markets by low fixed charges on large outputs. The Belgian steel syndicate is next referred to—modeled after those of Germany. While not in the sound position of steel companies of the United States, Germany and England, which control their own supplies of pig iron, while Belgium imports considerable pig iron and makes only one-thirteenth of its pig iron from native ore, the Belgians are strong competitors in rails, shapes, merchant iron and steel and wire nails, and half their exports are to countries which themselves produce iron and steel. France the writer considers to have been underestimated as a factor in international trade. Her per capita consumption is small, but her production has been increasing, having nearly doubled since 1891, and there are several successful syndicates. With a passing reference to Russia, Austria and Spain, the latter two of which have syndicates, while in the south of Russia is a recently formed syndicate controlling more than half the pig iron output, Mr. Jeans takes up finally Great Britain. It is pointed out that while there are no such powerful combinations as exist in the United States and Germany, most iron and steel products are represented by associations and the disposition to regulate competition has been more marked in recent years.

Many of the [British] districts producing pig iron have their local association, and the same applies to the bar iron trade. Plates, angles, rails, joists, tubes, galvanized sheets, wire, castings and forgings are some of the descriptions of iron and steel in which there are associations of makers, formed with a view of influencing if not controlling the home market. Some agreements embrace exports, but the difficulties of co-operation have resulted in international agreements being limited to products where the trade is in a very few hands, such as rails, or to go to an extreme in finished articles, like large gas engines.

This review of the conditions in the various countries brings the writer to the point that in view of the general existence of syndicates in the iron trade it is no

violent assumption that, with the exception of Great Britain, a scheme might be drawn up by the conference of a half dozen individuals representing the various syndicated countries. The question then presents itself, What products in the main and what tonnage would come under the operation of an international agreement? Pig iron is practically ruled out as too low priced a product to be diverted from natural channels to artificial ones, and as being too largely, so far as export trade is concerned, in the hands of merchants. Great Britain is chief in pig iron exports, and the figures present the anomaly of large British exports to Germany, while bounty fed German pig iron is at times sold in considerable quantities in Great Britain. In setting down the statistics of export iron and steel trade the first impression will probably be that they are not enormously large. Home or nearby demand is after all the dependence of iron and steel works in all countries. The paper goes back to 1894 in its general presentation of the export movement from the five leading countries, because in the next 10 years these exports practically doubled, while in three years more the figures of 1894 were nearly trebled. For 1894, 1904 and 1907 the showing is as follows in gross tons:

Exports of Pig Iron and Finished Iron and Steel.

	1894.		1904.		1907.	
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.
Great Britain...	2,656,000	65.6	3,266,000	38.0	5,166,000	44.5
Germany	752,000	18.6	2,770,000	32.3	3,452,000	29.7
United States...	82,000	2.0	1,167,000	13.6	1,301,000	11.2
Belgium	402,000	9.9	912,000	10.7	1,129,000	9.7
France	154,000	3.8	461,000	5.3	555,000	4.9
Totals.....	4,046,000		8,576,000		11,603,000	

The pig iron export movement of the five countries for 1904 and 1907 is put at 1,311,000 and 2,628,000 metric tons respectively, and the finished iron and steel trade for the two years at 7,279,000 and 9,033,000 tons respectively. Great Britain shipped 76 per cent. of the export of pig iron last year, Germany 10.4 per cent., the United States 2.9 per cent., Belgium 0.9 per cent. and France 9.7 per cent. Of export finished material Great Britain sent out 35.7 per cent. last year, Germany 35.2 per cent., the United States 13.6 per cent., Belgium 12.2 per cent. and France 3.3 per cent.

Referring to semifinished steel, it is shown that Great Britain is the chief importer and that Germany and the United States have been the chief exporters. The fluctuations in the movement have been notable. Great Britain has imported 3,000,000 tons since 1900, and the average imports and exports in the past four years have been as follows:

Average of Four Years' Imports and Exports of Semifinished Steel.—Gross Tons.

	Imports.	Exports.
Great Britain.....	484,000	9,500
Germany	6,000	460,000
United States.....	19,000	206,000
Belgium	130,000	23,000
France	3,000	164,000
	642,000	862,500

International regulation here would meet some diversities of interest. The British sheet and tin plate makers buying German and American sheet bars would be hurt by a uniformly higher price for sheet bars, and would be driven to build steel works or make an arrangement with British steel works—something they might well consider even now.

The exports of rails from the leading countries have not fluctuated greatly in the past few years. From 1903 to 1907 they have been respectively 1,328,000 tons, 1,386,000 tons, 1,313,000 tons, 1,386,000 tons and 1,405,000 tons. Of the last total, that for 1907, Great Britain exported 30.6 per cent., Germany 29.7 per cent., United

States 24.1 per cent., France 4.6 per cent. and Belgium 10.9 per cent. It is noted in the paper that the present International Rail Association embraces all the principal rail exporting countries, and the writer ventures the estimate that an additional \$5 a ton is secured on an export to neutral markets of roundly 1,400,000 tons a year.

In wire and wire nails the supremacy of Germany in the export trade is conspicuous. Out of a total of 748,000 tons of these products exported last year Great Britain shipped 13.5 per cent., Germany 52.6 per cent., United States 27.1 per cent., Belgium 6 per cent. and France 0.8 per cent. On the heavier gauges of wire British trade is dwindling, though the demand is largely from British markets. One difficulty in dealing with the British wire trade is that it is in so many hands, perhaps not less than 100 firms.

Of sheets and plates (not including tin plates and black plates for tinning) Great Britain is the chief exporter. Out of a total of 1,306,000 tons exported last year that country is credited with 58.7 per cent., Germany with 23 per cent., United States with 9.3 per cent., Belgium with 8.3 per cent. and France with 0.6 per cent. Of 418,275 tons of tin plates exported in 1907 Great Britain furnished 96.8 per cent. and the United States about three-fourths of the small balance.

Summing up, the regulation of prices and production in one country alone is naturally far easier than international regulation. The possibility of protecting each country's home market from competition by a general agreement is suggested, but it is also observed that for the most part the material now supplied each country is either not at present obtainable in that country or is manufactured on an insufficient scale. Great Britain, for example, needs semifinished steel. The lines, therefore, on which an international agreement would make its first advances would seem to be in the elimination of dumping and in maintaining in neutral markets substantially uniform prices on heavier products, like rails and structural material, of which almost the entire production is in the hands of large steel companies.

The Increase of Amateur Mechanics.

A growing demand is observed for what is known in the trade as amateur machinery. More tools are finding their way into the homes or little shops of men, old and young. Dealers who specialize in this class of equipment hardly know how to account for the increase, unless it is a result of the manual training and trade schools. Probably the owners of amateur machinery may be divided into two classes, those with hobbies which require some machine work in their construction, and those who are seriously at work on ideas which they hope to develop into commercial usefulness and financial profit. Professional men—lawyers, physicians and even clergymen—are numbered among the amateurs who buy machinery. The usual tool called for is a foot power lathe, back geared to give the power to reduce metal and cut threads. More ambitious or more well-to-do amateurs buy tools of the manual training type and drive with electric motor.

There has always been a scattering lot of mechanics, men who work at their trades regularly, who are developing inventions during their leisure hours. They need machinery at times. They may get in a few minutes in the shop occasionally, either by paying for the privilege or through the indulgence of foreman or superintendent. In these cases they require no machinery of their own.

In some shops such privileges would not be permitted, and the inventor is forced to do his work at home. Or he may wish to keep secret the fact that he is doing work outside and may, therefore, refrain from taking it to the shop. He is no amateur. A good mechanic can obtain first rate results from a lathe that requires foot-power to operate it. His planer work and, perhaps, some heavier operations, may have to be done outside. The real amateur may have to consider other things than cost. A lawyer who recently purchased a lathe made the important factor of his inquiry that the machine should take little space and make little noise in his household. The automobile has not had a great influence on this branch of the machinery business, few owners having shops of their own, except where they are rich enough to have an equipment of regular machine tools, and these cases are rare. Few automobile owners have the skill or desire to attempt to do repair work, and there are few places so small as not to possess an automobile repair shop.

It is entirely natural that the training of young men under manual training or trade school conditions should develop a mechanical taste which may be gratified later, even if the man enters a field of labor foreign to the shop. He is the possessor of a knowledge which would suggest hobbles or more useful ideas that would not otherwise come to him, and in gratifying them he would naturally desire to do his own work, and the amateur lathe or other mechanical tool enables him to do so. Possibly in a small percentage of such cases results may be obtained which will be practically useful. Ideas may be developed which will be worth while. Where the amateur in any trade seriously sets about a work from pure enthusiasm for it he may accomplish results which rival the efforts of the professional. At any rate it is a harmless and doubtless fascinating form of amusement.

CORRESPONDENCE.

Heat Equalization and Oxidation in the Baillot Cupola.

To the Editor: Referring to the report on the Baillot cupola, as it was seen and discussed at the Toronto convention of the American Foundrymen's Association in June last, the article in *The Iron Age* of November 19 says that in the discussion it was argued that the "tuyere region was where the heat was needed." This leaves in the reader's mind the impression that the Baillot system takes the heat upwards and away from that region, which is just the reverse of what it does and is intended to do. By their action the steam and the carbonic gas reduce the excessive temperatures in the immediate neighborhood of the tuyeres and raise that of the inner regions of the tuyere area, toward the center of the bed and thereby equalize these temperatures throughout the whole mass of the bed, and not upwards and away from it, as implied in the words used in the article.

Further on it is said: "Some point has been made also of the oxidizing action at the point where the vapor in the returned gases is separated into hydrogen and oxygen," and, it is added, "how far the liability of the molten iron to take up oxygen may detract from the advantages of the process, is the question raised in this connection." On these points permit me to say:

1. That the volume of the blast per pound of iron is smaller in the case of the Baillot cupola than in that of any other and that, in consequence, the quantity of oxygen brought into contact with the iron on that head alone is smaller in that case and the liability to oxidation correspondingly reduced.

2. That aside from the volume of the blast being smaller, it is further reduced by the presence of the inert gases and vapors drawn into it through the recuperator and out of the cupola. The greater portion of these

gases, by the way, are deoxidizing agents and therefore not at all liable to oxidize the iron. With steam, for instance, the reaction in the presence of red hot carbon is:



and with carbonic gas:



Both of these reactions are reductive in their effect, or the very reverse of oxidizing.

3. That these reactions lower the temperature of the medium in which they take place and so further reduce the chances of the molten iron encountering high temperatures at which it would be liable to burn or oxidize.

LOUIS H. BACQUE.

WESTMOUNT, near Montreal, Canada, December 1, 1908.

Vanadium.

To the Editor: With reference to the letters of Mr. Auchy and myself, which appeared in your issue of December 3, I would take this opportunity of sending to you many detailed experiments published with records of tests on various vanadium steels made in America, unfortunately their publication *in extenso* would probably not be considered practicable to you. In addition to these, the records of numerous English societies of 1904, 1905 and 1906 will bear evidence that the investigations of vanadium steel have not been confined to two or three laboratory researches. In view of the above, I venture to think that Mr. Auchy's accusation of "modest diffidence" on my part is not quite deserved. But as practical demonstration has always been, and always will be, considered of more value than laboratory proofs, I cannot do better than recall to Mr. Auchy's attention the comprehensive exhibit of vanadium steels presented at the annual convention of master mechanics and master car builders at Atlantic City in June of this year, when commercial applications and many service results (which results be it noted had been developed from the laboratory investigations of years) were shown in most varied detail.

The above quoted furnish the "facts" desired by Mr. Auchy. It may be permissible for me to draw your attention to the obvious printer's error contained in that portion of my letter of November 18 dealing with the scavenging action of vanadium, the correct reading being that "0.1 per cent. is a common requirement even in open hearth steels which have been well deoxidized by the ordinary means."

J. KENT SMITH.

PITTSBURGH, December 4, 1908.

The Ohio Seamless Tube Company.

The new works of the Ohio Seamless Tube Company, at Shelby, Ohio, now being erected on the site of the plant of the Shelby Seamless Tube Company that was destroyed by fire last June, is rapidly nearing completion. The main building, for cold drawing and finishing shops, will be 100 x 360 ft. The annealing and pickling shop will be 85 x 320 ft. The hot work piercing and rolling shop will be 130 x 220 ft. Other buildings are the gas producer plant, 25 x 40 ft., and annealing furnaces, 30 x 80 ft. All are of steel frame work construction. For facilitating the handling of material and product, tracks are laid through the center of each of the principal buildings. The entire plant will be equipped with the latest appliances for the production of seamless tubing of all sizes and gauges, and every effort is being put forth to make it the best of its kind in the world. The company will be managed by men long and favorably known as having been connected with the old Shelby tube plant, and will employ former operatives of the old works, who have made seamless tube production a study. It is expected that the new plant will be ready to start up by February 1, and the company has already booked a very satisfactory volume of business for delivery during the coming year.

A By-Product Coke Plant at Indianapolis.—The Citizens Gas Company, Indianapolis, Ind., is building a plant of 50 by-product coke ovens on the United-Otto system. The plant is to be fitted with all accessory ap-

paratus for the production of illuminating gas by the separation method and recovery of by-products. Construction is being actively prosecuted under four contractors, as follows: The United Coke & Gas Company, which has the contract for construction of the ovens, the cooling and ammonia plants, the power plant and some other important parts of the work; the Western Gas Construction Company, which has the contract for the purifiers; the Kerr-Murray Mfg. Company, which has the contract for the two gas holders, and the Henry Pratt Boiler & Machine Company, which has the contract for the greater part of the water gas plant. The main building is one of the largest in that section of the country, and is strongly constructed so that it can carry a huge traveling crane and the hoisting machinery used in the erection of the ovens. In the construction of this plant the design contemplates the best materials and most modern processes. The plate work is much heavier than that commonly used. The character of the work being done by the United Coke & Gas Company is the object of particularly favorable comment. The coke produced will be used in part for metallurgical purposes or will be crushed and sized for domestic service.

October Iron and Steel Exports and Imports.

As compared with the previous month, not much change is noted in either the export or import trade in iron and steel and manufactures thereof for October by the Bureau of Statistics of the Department of Commerce and Labor. The total value of the October exports, not including ore, was \$11,505,063, against \$11,074,653 in September. The figures for commodities for which quantities are published show a slight increase, being 85,667 gross tons, against 76,727 tons in September. The following table gives these exports for each month of the current year:

Month.	Gross tons.	Month.	Gross tons.
January	74,352	June	69,778
February	81,755	July	86,806
March	96,437	August	87,198
April	93,522	September	76,727
May	64,020	October	85,667

The details of the exports of the same commodities for October and for the 10 months ending with October, as compared with the corresponding periods of 1907, are as follows:

Exports of Iron and Steel.			
October.		Ten months.	
1908.	1907.	1908.	1907.
Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	6,521	4,306	37,089
Scrap	992	1,545	18,083
Bar iron.....	661	2,007	6,352
Wire rods.....	1,199	396	5,662
Steel Bars.....	3,711	7,500	36,272
Billets, blooms, &c.....	10,437	5,840	96,752
Hoop, band, &c.....	215	375	3,672
Steel rails.....	19,364	34,753	175,462
Iron sheets and plates.	4,180	3,565	36,309
Steel sheets and plates	5,155	6,549	48,749
Tin and terne plates.	72	430	11,473
Structural iron and steel	9,079	15,587	100,527
Barb wire*.....	7,099	15,973	20,321
Wire	4,396		90,720
Cut nails.....	415	675	5,944
Wire nails.....	1,276	2,874	21,568
All other nails, including tacks.....	669	822	4,205
Pipes and fittings....	10,226	19,976	96,197
Totals.....	85,667	123,173	815,357

* Not separately stated prior to July 1, 1908.

The total value of the imports of iron and steel, not including ore, for October was \$1,466,436, against \$1,515,584 in September. The imports of commodities for which quantities are given are still quite insignificant, being only 13,214 gross tons, against 13,122 tons in September. The imports of this character for each month of the current year are shown in the following table:

Month.	Gross tons.	Month.	Gross tons.
January	28,008	June	21,109
February	19,054	July	18,320
March	15,885	August	13,186
April	12,342	September	13,122
May	13,584	October	13,214

The details of the imports of the same commodities for October and for the 10 months ending with October, as compared with the corresponding periods of 1907, are as follows:

Imports of Iron and Steel.			
October.		Ten months.	
1908.	1907.	1908.	1907.
Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	8,103	9,893	73,383
Scrap	82	650	3,748
Bar iron.....	766	2,420	15,801
Rails	197	155	1,321
Hoop, band, &c.....	203	52	697
Billets, bars and steel in forms n.e.s.....	568	1,579	7,762
Sheets and plates....	191	206	1,976
Tin and terne plates.	1,656	5,140	51,368
Wire rods.....	933	996	9,503
Structural iron and steel	515	132	2,299
Totals.....	13,214	21,223	167,858

The imports of iron ore in October were 77,932 gross tons, against 57,945 tons in September. The total iron ore imports for the 10 months ending with October were 560,840 tons, against 1,055,701 tons in the corresponding period of 1907.

The total value of all kinds of exports of iron and steel, not including ore, was \$127,985,824 in the 10 months ending with October, against \$165,017,157 in the corresponding period of 1907. Similar imports were, respectively, \$16,389,631 and \$34,116,740. The decline in the imports was thus over 53 per cent., while the decline in the exports was only about 22 per cent.

The Westinghouse Receivers Discharged.

The receivers of the Westinghouse Electric & Mfg. Company and the Securities Investment Company were discharged in the United States Circuit Court at Pittsburgh, December 5. No accounts of the receivers are required to be filed by the order of the court.

The companies were represented as being in sound financial condition, the court being told that the debts of the Westinghouse Electric & Mfg. Company had been arranged for with the exception of unassenting creditors with claims to the amount of about \$700,000, who will at once be paid in cash. The company has cash on hand amounting to about \$15,000,000. The cash of the Securities Investment Company now on hand is about \$17,000,000, with unassenting creditors representing only about \$15,000.

The new Board of Directors of the electric company met December 7 and elected George Westinghouse, president; E. M. Herr, first vice-president; L. A. Osborne, second vice-president; George W. Hebard and Walter M. McFarland, acting vice-presidents; Charles A. Terry, secretary; T. A. Slemon, treasurer; E. St. John and H. F. Baltz, assistant treasurer; J. C. Bennett, auditor; F. E. Craig and W. B. Covil, Jr., assistant auditors. E. C. Converse, a director of the United States Steel Corporation, was elected chairman of the board.

A Large Government Valve Order.—Last June the Isthmian Canal Commission invited bids for a large quantity of bronze globe and angle valves fitted with seats and discs that were capable of being renewed. Considerable competition resulted, and after the authorities at both the Isthmus and Washington had carefully considered the bids submitted by a number of manufacturers, they decided, a few days ago, to place the order comprising upward of 7000 valves, in sizes ranging from ¼ to 3 in., for the Lunkenheimer Renewo renewable seat and disk regrinding valve. This is considered quite a tribute to the efficiency of design of this article, especially in view of the fact that it has not been upon the market quite as long as some other well-known makes. This valve is practically indestructible, inasmuch as every part that is subjected to any possible wear can be easily, quickly and cheaply renewed, which is a most desirable feature. These valves are guaranteed for 200 lb. working pressure and are manufactured by the Lunkenheimer Company, Cincinnati, Ohio, having branches at New York, Chicago, and London, England.

The National Supply and Machinery Dealers' Association.

The annual meeting of the National Supply and Machinery Dealers' Association will be held in Pittsburgh May 12, 13 and 14, 1909. This was decided on at the midyear meeting of the Executive Committee, held at the Hollenden Hotel, Cleveland, December 2. During the session of the committee a conference was held with J. C. Miller, president of the Southern Supply and Machinery Manufacturers' Association, and Charles F. Aarons and F. D. Mitchell, president and secretary-treasurer, respectively, of the American Supply and Machinery Manufacturers' Association, regarding the place at which the next annual meeting of the three associations should be held. While definite action was not taken as to the place of the annual meeting of the Southern machinery men and the supply and machinery manufacturers, these two organizations will probably decide to meet in Pittsburgh on the same date.

President George Puchta of the National Supply and Machinery Dealers' Association discussed some of the advantages and disadvantages of joint sessions, reflecting the views of the members of his association, as far as they had been ascertained. A number of dealers do not believe that the joint sessions afford sufficient time for the careful consideration of the business that calls them together; that too much time is given in the joint sessions to addresses and discussions of a general character, and that more effective work can be done by giving more time to the consideration of important questions in small committees and in separate executive sessions of the three organizations. He said that many, however, acknowledged the advantage of the joint sessions in bringing together a larger number of dealers, thus affording a much greater opportunity to extend acquaintanceship and for the interchange of opinion regarding conditions of trade. It was pointed out that if joint sessions were held the selection of the place of meeting should be made with reference to the wishes of the other organizations, and this is likely to result in the future, as it has in at least one instance in the past, in the selection of a place so remote from the majority of the members of the National Supply and Machinery Dealers' Association as to reduce seriously the number in attendance. Mr. Puchta said that owing to the large area of the country some of the members of his organization believed that the interests of each association would be better served if each should select its own place of meeting with reference to its own membership. It was admitted that the friendly relations which have grown out of the joint sessions are valuable to the work of each association, and that should it be decided to hold separate meetings many of the friendly and co-operative benefits might be retained by joint meetings of the executive committees of the three associations during the year.

President Miller of the Southern Supply and Machinery Dealers' Association said that many of the members of his association thought the joint sessions were very beneficial, although a number admitted that the division of time was such that many important questions did not receive proper consideration. Their desire, he said, seemed to be to retain the benefits of the joint sessions, but to make such changes as would bring about the most good. Mr. Miller said that an informal expression had been taken among the members of the Southern Dealers' Association, and Chattanooga was strongly favored as the next place of meeting, but he had become satisfied that that city would not be acceptable to the other two associations. He could not say definitely whether his members would be satisfied with Pittsburgh as the place of meeting.

President Aarons of the American Supply and Machinery Manufacturers' Association said he believed the interests of all the associations would be much better served by a joint meeting, and he suggested Pittsburgh or Louisville. He thought the attendance of manufacturers would probably be small if the annual meetings of the dealers' associations were held at different times and places. The fact that the joint meeting afforded an op-

portunity for manufacturers and dealers to mingle together was a great stimulus in securing members.

After further discussion a resolution was unanimously adopted declaring that it was the sense of the conference that the annual meetings of the three associations be held in Pittsburgh on the days named. The presidents of the Southern Dealers' and the Manufacturers' associations will take up the matter of the meeting place at once with their respective organizations, and it is believed that they will agree to a joint meeting in Pittsburgh. It is probable that a joint committee of one from each organization will be chosen to make the necessary arrangements.

The Executive Committee of the National Supply and Machinery Dealers' Association considered a number of matters that will be brought up at the annual meeting. Among other things the committee reaffirmed its former action opposing parcel post, and opposing the policy of the Federal Government in inviting manufacturers to bid direct on Government specifications, against which resolutions have been adopted by the association at previous annual meetings.

A report was received from Henry Prentiss, first vice-president, and P. M. Brotherhood, chairman of the Machinery Committee, on the recent annual meeting of the National Machine Tool Builders' Association, which they attended as delegates of the Dealers' Association.

The Philadelphia Foundrymen's Association.

The regular monthly meeting of the Philadelphia Foundrymen's Association was held on the evening of December 2, at the Manufacturers' Club. Thomas Devlin, president, as ex officio member of the committee representing the association at the Atlantic Deeper Waterways convention, held in Baltimore last week, reported that he was well pleased with the work of that convention, and he believed that the construction of such inland waterways would be of great benefit to manufacturers generally.

The nomination of officers to serve for the ensuing year, whose election takes place at the January meeting, was referred to a Nominating Committee, the president naming the following: A. A. Miller, *The Iron Age*, Philadelphia; Arthur Simonson, Tropenas Steel Company, New Castle, Del., and Walter T. MacDonald, Schaum & Uhlinger, Philadelphia.

The paper for the evening was on "Chemical Specifications for Pig Iron," by George C. Davis, chemist, Philadelphia. It caused a most animated discussion on the question of pig iron specifications.

Walter Wood, chairman of the Pig Iron Specification Committee of the American Society for Testing Materials, said that the paper had brought out, among other things, two very essential points in the matter of pig iron specifications, "fussiness" and "hair splitting" in the drawing, as well as following the letter and spirit of such specifications. First of all, he said, we must get away absolutely from the old time fracture grading method. It is obsolete, and irons from different producing sections show wide variance in fracture. Buying should be based on analysis exclusively, and a sufficient leeway established to permit producers of pig iron to meet such specifications under reasonable working conditions of their furnaces. What this leeway should be has not been determined. Some allow $\frac{1}{4}$ and others $\frac{1}{2}$ per cent. of silicon content; others specify such a small margin that it is practically impossible to meet the requirements, as the analyses of different pigs in the same cast of iron frequently show a greater variance in silicon and sulphur than is allowed by some of the so-called "freak specifications."

Dr. Richard Moldenke did not favor the mixture of irons with widely varied analyses, uncertainty of the mixture in practice being too great. In his experience the best practice has been to get iron approaching as nearly as possible in general composition to that desired for the work to be done.

A. E. Outerbridge, Jr., Wm. Sellers & Co., referred to the increasing silicon content and decreasing sulphur

content to be noted in pig iron when compared with the practice of 25 years ago. That very marked strides had been made in furnace practice since the value of the various elements in the iron had been determined was unquestioned. The mechanical casting of pig iron, he said, has deposed fracture grading entirely, and he had determined by actual practice that a marked reduction of fuel consumption was to be noted when such sandless pig was used in the cupola. Different classes of work permit of the use of iron showing some variation in composition and furnaces, therefore should not be held down by too rigid specifications.

H. L. Haldeman, Pulaski Iron Company, said that he had experienced more or less difficulty with specifications drawn by inexperienced parties, and that, when such as were considered too rigid were offered, it was his custom to refuse to quote on them. Chemists vary greatly, even on identical samples, and there should be a reasonable variation allowed and a universal system of sampling adopted, as the analysis obtained, not only from different pigs in the same cast, but also in some elements, sulphur particularly, dependent on the portion of the pig from which the sample is taken, shows a variation in sample drillings taken from the top, bottom or center of the pig.

Dr. E. E. Brown, W. S. Shennan, Geo. C. Davies, A. Simonson and E. C. Spencer also took part in the discussion, as a result of which the following resolution was offered and unanimously adopted: "It is the sense of this meeting that the grading of pig iron by fracture be abandoned and that purchases made should be based on the chemical analysis."

After further general discussion on what should be a reasonable range in specifications on silicon, manganese, sulphur and phosphorus content, both for the purpose of establishing a price basis, as well as for the different uses of pig iron, it was moved that the matter be referred to a committee of five, whose recommendations be reported at the January meeting of the association. The motion passed unanimously and President Devlin appointed the following committee: Walter Wood, R. D. Wood & Co.; A. E. Outerbridge, Jr., Wm. Sellers & Co.; Dr. Richard Moldenke, secretary American Foundrymen's Association; George C. Davies, Pilling & Crane, and Geo. C. Davis, chemist. H. L. Haldeman, Pulaski Iron Company, was appointed as an alternate for Mr. Davis.

British Trade Unions Against Working Overtime.

The Management Committee of the General Federation of Trade Unions in Great Britain has issued a manifesto which says:

Board of Trade statistics, trade union returns, and processions of the workless alike testify to the fact of unemployment and to the grave nature of the situation. Engineering trade unions, with a membership of 153,363, report an unemployed percentage of 12, while shipbuilding unions, with a membership of 60,631, have 25.2 per cent. of their members out of work. The average percentage of totally or partially unemployed among skilled workers is little short of 10 per cent.

For every skilled workman out of employment two unskilled men are workless. Every worker represents a family of five. Skilled workers unemployed, 500,000; unskilled, 1,000,000; their families, 6,000,000; total, 7,500,000. In the hope of mitigating the evils of these depressions we recommend that all public bodies supervise their own direct and indirect employment; that they stipulate in their contracts for the total abolition of overtime, and distribute their work so as to meet the periods of depression and the worst conditions of unemployment. We also advise trade unions to issue executive instructions to their members to refuse to work overtime. We urge the immediate employment of surplus labor by the reclamation of waste lands, the provision of additional recreation grounds, the protection of foreshores and riversides from the encroachment of sea or stream, the development of harbor facilities, afforestation, the acquirement of land, and the building or rebuilding of houses for the workers on improved sanitary principles; the encouragement of municipal and co-operative farms, the systematic co-ordination of municipal and governmental regulations and machinery for unemployment, the acquisition by the State of the canal and railroad systems throughout the United Kingdom, and the full development of the small-holdings act, with the State as proprietor.

It is also recommended that a national department of

labor be established, presided over by a minister with a seat in the cabinet, charged with the direction of that labor which has not been absorbed in the ordinary course, and that a permanent unemployed board be created.

A Basic Pig Iron Contract.

Herewith is given a copy of a contract which has been adopted by the sellers of basic pig iron in the Philadelphia territory, and has received the approval of the buyers:

CONTRACT.

NO. IN DUPLICATE.

AGREES TO SELL AND SHIP, AND
AGREES TO BUY AND RECEIVE,

DESCRIPTION OF GOODS:

QUANTITY: Tons of 2240 lbs.

SPECIFICATION: Phosphorus not to exceed 1.00%
Silicon " " " 1.00%
Sulphur " " " .05%

TIME OF SHIPMENT:

PLACE OF DELIVERY: F. o. b. cars

PRICE:

TERMS:

Each month's shipments to be treated as a separate and independent contract, but if buyer fails to fulfill terms of payment under any of these separate contracts, or other contracts with seller, seller may defer performance of all the remaining contracts of shipment until payment is made, or may rescind such remaining contracts at its option. Waiver by the seller of the terms of payment in any instance shall not be construed as an abandonment of its said rights.

Strikes, differences with workmen, accidents to machinery, fires, floods, wars, interruption to transportation or car supply, or to sources of supply of raw materials, or other contingencies beyond the reasonable control of the seller, to be sufficient excuse for any delay traceable to such causes. Similar conditions affecting the works of the buyer shall be sufficient excuse for any delay in accepting shipments, traceable to such causes. In the event of such delays, shipments will be made pro-rata as nearly as practicable on all contracts then uncompleted.

Buyer shall have the privilege of canceling any shortage of any month's deliveries by giving notice in writing of such cancellation to the seller during the succeeding month, but seller shall have 10 days after receipt of said notice within which to make up said shortage; any shortage not shipped during said 10 days shall be canceled. In case of failure to receive by buyer, seller shall have privilege of cancellation upon the same conditions as above. In case neither party shall exercise this right of cancellation, it is understood and agreed that no cancellation can thereafter be made, and the amount of said shortage shall be delivered and received, the period of deliveries under the contract being proportionately extended, unless time of deliveries shall be otherwise agreed upon in writing. Unless otherwise arranged, any shortage not canceled as above shall be postponed and delivered after completion of the regular deliveries stipulated under the contract. Notice of cancellation of any month's quota shall not affect the deliveries of any other month.

REMARKS:

This form of contract became effective about the middle of November. Its special feature is its reference to the privilege on the part of both buyer and seller to cancel shortages of any month's deliveries.

The Board of Public Works of the city of Milwaukee, Wis., has awarded the contract for the building of a new bascule bridge, at East Water street, to Arthur H. Vogel, president of the Starke Dredge & Dock Company, for \$139,785. The structure is to be completed before September 1, 1909. The bids on the structure were lower than the original estimates, which amounted to \$150,000. It will be the largest bridge in Milwaukee. The bascule will have a span of 130 ft., and the total length of the bridge will be 270 ft., with a roadway 37 ft. 8 in. wide, two sidewalks 12 ft. wide, and counterweights which will weigh 500 tons.

PERSONAL.

G. L. Bollinger, president of the Bollinger-Andrews Construction Company, Empire Building, Pittsburgh, Pa., has returned from a trip to Europe.

Albert P. Saxer, formerly in the machine department of the Fort Wayne shops of the Pennsylvania Railroad Company, Pittsburgh, is now attached to the sales department of the Brown & Zortman Machinery Company, Pittsburgh, dealer in new and second-hand machinery.

Fred W. Payne has sold his half interest in the Auburn Foundry Company, Auburn, Ind., to a partner, Frank A. Borst, and will go to Chicago to take the management of the National Trade Show Company, of which he is vice-president.

L. B. Powell, who has for a number of years been actively connected with the sales department of the Hayden-Corbett Chain Company, Columbus, Ohio, has tendered his resignation, effective December 24, to accept the position of general sales agent of the Climax Chain Company, St. Louis, Mo. Mr. Powell has made a careful study of the history and the development of the chain industry, and is the author of several technical papers relating to the manufacture of this commodity, one of which appeared in *The Iron Age* of January 5, 1905, entitled "The Manufacture of Chain."

Joseph G. Butler, Jr., who has been mentioned as among the candidates for the office of United States Senator from Ohio, announces that he is not a candidate for that or any other political position.

J. N. Richards, for the last 14 years general sales manager for the Standard Paint Company, is now associated with the Ernst Wiener Company, railroad specialist for all industries. He will make his headquarters for the present at the company's main office, 50 Church street, New York.

Meldon H. Merrill, who, as salesman for the Westinghouse Electric & Mfg. Company has been active for some years in promoting the introduction of electric drive among the textile mills in New England, recently resigned his position with that company and has taken up similar work in connection with the Boston office of the Allis-Chalmers Company.

E. F. Axner, formerly local sales manager of the Chicago office of Matthew Addy & Co., has been appointed sales agent at Chicago for the pig iron product of the Tennessee Coal, Iron & Railroad Company under George Baker, manager of sales.

Some changes have gone into effect among officials at the Homestead Works of the Carnegie Steel Company. J. S. Unger has retired as assistant general manager to become head of the new department of scientific research of the United States Steel Corporation. He is succeeded by A. A. Corey, Jr., superintendent of the Donora Works. R. H. Watson, chief metallurgist, became second assistant superintendent, and he was succeeded by P. P. Reese.

Samuel Morton has been made superintendent of the open hearth department of the Duquesne Works of the Carnegie Steel Company, succeeding J. H. Lewis, who has been made general superintendent of the open hearth department at the Donora Works of the American Steel & Wire Company.

OBITUARY.

EDWARD F. C. YOUNG, Jersey City, N. J., died December 6, aged 73 years. He was born near Morristown, N. J., started his business life as a messenger in Jersey City, and at the time of his death had an official connection with 24 financial and industrial enterprises. Among other important business connections, he was president of the Joseph Dixon Crucible Company, American Graphite Company, Hudson County Gas Company, North Jersey Land Company and Consolidated Traction Company. Besides being president of the First National Bank of Jersey City, he was head of the Pavonia Trust Company and a director in eight other financial institutions. During

the years of his greatest activity he is said to have been connected with more enterprises than any other individual in New Jersey, and his name became foremost in the financial and commercial affairs of the State. He leaves a widow, one son and one daughter.

EDWIN H. JONES, president of the Vulcan Iron Works, Wilkes-Barre, Pa., died December 2, aged 64 years.

HENRY P. COBURN, vice-president and general manager of the Sawyer & Massey Company, Ltd., manufacturer of agricultural implements, Hamilton, Canada, died November 25, aged 73 years. He was born at Dracut, Mass., and spent his early manhood at Stamford, Conn. In 1864 he entered the service of L. D. Sawyer & Co., Hamilton, as a clerk, advancing through every department of the business until the reorganization of the company, which took place in the year 1889, under the present name when he was chosen by the directors as its vice-president and general manager, which office he held and filled so satisfactorily until the time of his death. He had thus been associated with the business for 44 years. He leaves a widow.

HENRY N. BURHANS, Syracuse, N. Y., died December 2, aged 69 years. He was born at DeWitt, N. Y., and served in the Union army during the Civil War, entering as first lieutenant, and being mustered out as colonel by brevet. After the war he located at Fayetteville, N. Y., and became a member of the firm of Burhans, Blanchard & Co., in which his father was senior partner. In 1874 he purchased the firm's builders' supply house in Syracuse, which in 1876 was merged in the firm of Burhans & Black, later becoming the Burhans & Black Company, which has taken a prominent place among the jobbing houses of the State. About three years ago he was elected department commander of the Grand Army of the Republic for the State of New York. He was a trustee of the Soldiers' Home at Bath, N. Y. He leaves a daughter and two sons.

JOHN CARNES, Lima, Ohio, founder of the Lima Locomotive Works, died November 28, aged 80 years. His son, Ira P. Carnes, continues his interests in the plant.

JAMES KINDRED, Worcester, Mass., head of the firm of Boynton & Plummer, manufacturers of blacksmiths' tools, died December 7, aged 57 years. He was a native of St. Johns, New Brunswick, and went to Worcester when 18 years old and learned the machinist's trade in the shops of the Prentice Bros. Company. From there he went to the works of Boynton & Plummer where he remained, first as an employee and later as the owner, until a month ago, when he retired on account of ill health. He leaves a widow and one daughter.

EDWARD A. HUMMELL, chief salesman of Rogers, Brown & Co., Buffalo, died at his home near Buffalo, December 7, from typhoid fever, aged 28 years. He had been associated with the firm for the past 14 years, entering its service as office boy, and rapidly working upward. For the past few years he represented the firm on the road, principally in the State of New York.

HENRY AIKEN, the well-known consulting engineer, died suddenly of heart failure at his home in Pittsburgh December 8. He had been at his office the previous day. He was born in Ireland 66 years ago. Coming to America about 30 years ago, he first located in Philadelphia. He then removed to Pittsburgh and in 1889 took up mechanical engineering and was soon recognized as one of the foremost engineers in the country. He was the inventor of a large number of labor saving appliances now in use in operating blast furnaces and steel plants. He was president of the Hydraulic Machine Company and a director of the Real Estate Trust Company, Pittsburgh. He leaves a widow and one daughter.

LOYAL LEVI MUNN, Freeport, Ill., died November 23, aged 79 years. Beginning life in New York State as a poor boy, he rose by his own efforts to an influential position as citizen, business man and capitalist. Although identified with many local enterprises, he was best known for his connection with the Arcade Mfg. Company of Freeport, of which he had been president since 1893. He was one of the most prominent Masons in the West, having held some of the highest positions in the order.

Chemical Specifications for Foundry Iron.*

BY GEORGE C. DAVIS, PHILADELPHIA.

Recently my attention has been called to so many complaints of the pig iron specifications drawn up by purchasers that I thought it worth while to collect what facts I could and find if possible where the trouble lay. It is generally agreed that chemical specifications for iron are superior to the old method of grading by fracture. That being the case, it remains to draw up some scheme that is generally recognized. The blast furnace representatives have attempted to do this, but unfortunately many large purchasers of iron ignore it and have drawn their own; in some cases with such restrictions that they are practically unworkable or apparently without much regard to the iron available in their locality.

There certainly is a wide variety to choose from in this locality, for we have a number of different kinds which can be roughly classified as follows: Those made from magnetite, those made mainly from lake ores, Virginia irons made from brown ore, Alabama irons made largely from the red ores, various foreign makes, chiefly English and Scotch, and lastly two brands of local cinder iron. Where one considers the possible combinations by which a mixture can be made it seems to me to be unwise to draw up such specifications for manganese and phosphorus that would exclude many furnaces from bidding when by combining several brands the mixture wanted can be obtained.

I think my point can best be made clear by an illustration taken from actual practice.

One railroad specifies for No. 1 iron, silicon, 2.75 to 4.50 per cent.; phosphorus, 0.40 to 0.70 per cent.

The silicon limits are wide enough. Presumably the iron is intended for light section castings, and then the question arises, Why so low phosphorus? It so happens that there are a number of furnaces near the lines of this road making a high grade foundry iron usually running 0.70 to 0.90 phosphorus. Why should they be shut out from competing when by mixing with the lower phosphorus lake ore irons, which are also available, the desired result could be obtained.

Two other railroad companies specify, for No. 1 iron, 0.02 per cent. sulphur or less. Now, can this small amount be determined with such accuracy that the buyer would be justified in rejecting it if it ran slightly higher? The United States Bureau of Standards prepares standardized samples of iron, and in so doing employs the best chemists. One of its pig iron samples shows a range from 0.032 to 0.036 per cent. sulphur in the results of five chemists; not a great difference, it is true, but suppose there was a like variation on 0.02 iron, who could say which result was correct and whether the iron should be rejected or not? The blast furnace specifications for No. 1 iron call for 0.03 per cent. sulphur or less in the Eastern and 0.05 or less in the other districts. This is a grade that can be easily made enough below the maximum limit to allow for such variations. As a matter of actual foundry practice, how can such small variations be detected in the casting? This iron is melted with coke, from which it gains from 0.03 to 0.05 per cent. sulphur. An iron containing 0.02 sulphur would then contain from 0.05 to 0.07 in the casting. Under these conditions a variation of a few thousandths of a per cent. in the sulphur contents of the pig doesn't seem to be of much importance.

Another case that came to my notice was a large lot of iron rejected for being 0.001 per cent. below the limit in manganese. Now, this element cannot be determined with such accuracy. In sample C of the Bureau of Standards the manganese reported by five chemists ranges from 0.62 to 0.68. In a standard steel the results by six chemists range from 0.385 to 0.43. If the results of three other chemists who also worked on the sample were included, the variation would be much greater. It so happened that the transaction referred to took place on a rising market, and the iron rejected had to be removed by the seller when the railroad purchased other iron at

an increased price. If the purchaser had bought an additional carload of high manganese iron the whole matter could have been adjusted without loss or delay. In short, too much fussiness about specifications is often costly to the foundry. Other similar disputes have come to my notice, but I think those given illustrate the points made.

In closing, a word as to the blast furnace specifications. As they now stand, five districts are named: Southern, Eastern, Central West and Lake Points, Chicago and Buffalo. The last three named all use lake ores, and it seems to me highly desirable for the sake of simplicity that their silicon and sulphur specifications be made uniform. The differences that now exist are trifling. What seems to me to be needed on the part of consumers is a knowledge of what can reasonably be demanded of the producers and specifications so drawn (more especially for phosphorus and manganese) that as many furnaces as possible can compete.

The Cement Users' Convention.

The National Association of Cement Users is making elaborate preparations for its fifth annual convention, to be held in the Hotel Hollenden, Cleveland, Ohio, January 11 to 16, 1909. In connection with this meeting a very complete exhibition of cement products and appliances will be held. For this exhibition the Central Armory has been secured. The applications for space already exceed 95 per cent. of the space available, so that the exhibit bids fair to exceed by far any that has been previously held. Through the efforts of a Committee of Publicity the attendance is expected to exceed greatly that at the convention at Buffalo, N. Y., last year. In this connection it may be well to note that the use of cement is becoming greater every year. Its wide and varied uses, especially as regards the small consumer, make it of prime interest to every one. Notwithstanding its general use, its properties are not yet thoroughly understood, so that the coming convention and exhibit will be of special interest, not only to the users of cement, but the general public as well. Those attending will get an excellent opportunity to study the many ways in which it can be applied, as well as the advances which have been made during the past year. The foremost cement experts of the country will be brought together, and papers will be read and discussed concerning the proper use of this material.

Railroad Legislation and Business Interests.—The Railway Business Association, Geo. A. Post, president, 2 Rector street, New York, has taken up the work of urging that all who are interested in the speedy return to activity of transportation interests, and a resumption on the part of the railroads of purchases of material and equipment, will at once address demands upon their legislative representatives in State and national capitals for reasonable enactments, and for a favorable attitude toward a fair adjustment of rates. That the campaign is to be an aggressive one is indicated by the selection of G. M. Basford, assistant to the president of the American Locomotive Company, as acting secretary. Mr. Basford will give assiduous attention for several months to the effort which the association is making to show the public that anything hurting railroads also hurts whole communities of people directly and hosts of others indirectly, and that there is immediate necessity for a change toward moderation and calmness in railroad legislation.

The steel collier *Prometheus* was launched December 5 at the Mare Island Navy Yard, San Francisco. The ship has a displacement of 12,500 tons and is the largest of its kind so far launched. The length over all is 465 ft. 9 in.; breadth molded, 60 ft.; depth molded, 36 ft. 6 in.; cargo capacity, 6000 tons; speed, 16 knots; armament, four 3-in. rapid fire guns. The keel was laid in October, 1907, and the vessel can be ready for service by January 1 if necessary.

* Read before the Philadelphia Foundrymen's Association, December 2.

Pig Iron in November.

An Output of 1,577,854 Gross Tons.

A 4 Per Cent. Increase Over the October Daily Rate, with a Gain of 10 Active Furnaces.

November, a short month, shows a slightly greater production of coke and anthracite pig iron than October with 31 days. The number of furnaces in blast was 210 on December 1, a net gain of 10, and December is entered upon with an estimated daily capacity, based largely on the product in November, of 54,443 tons. In November the output was 1,577,854 gross tons, a daily average of 52,595 tons, against 50,554 tons in October. Thus the gain in the daily rate was about 4 per cent. In November and about that rate of gain over November is indicated for December. The merchant furnaces gained about 1500 tons a day last month over October, and the steel works furnaces about 500 tons. The weekly active capacity is put at 381,102 tons December 1, against 362,685 tons November 1. Among furnaces blown in last month were three new ones—the two stacks of the Youngstown Sheet & Tube Company in the Mahoning Valley and the new Ironton Furnace in the Hanging Rock District of Ohio. The daily rate of production by months for this year is as follows:

Daily Rate of Production.—Gross Tons.			
	Steel works.	Merchant.	Total.
January	21,432	12,286	33,718
February	25,717	11,446	37,163
March	27,145	12,474	39,619
April	24,185	14,104	38,289
May	24,505	13,098	37,603
June	23,923	12,521	36,444
July	25,762	13,525	39,287
August	28,952	14,899	43,851
September	31,117	16,183	47,300
October	32,217	18,337	50,554
November	32,705	19,890	52,595

November Product by Districts.

The table below gives the production of coke and anthracite furnaces in November and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.					
	July (31 days)	August (31 days)	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)
New York....	66,498	83,004	108,453	120,191	123,640
New Jersey...	14,830	16,866	16,544	17,036	16,273
Lehigh Valley.	28,028	36,701	42,184	41,775	45,763
Schuylkill Val.	25,115	24,586	23,918	47,210	51,397
Lower Susquehanna and Lebanon Val.	26,204	23,632	24,170	31,304	32,800
Pittsburgh Dis.	303,645	362,417	359,132	387,207	398,314
Shenango Val.	82,978	91,534	93,372	103,393	92,187
West. Penn....	63,433	73,207	72,633	97,052	89,094
Md., Va. and Kentucky...	46,635	47,492	50,150	51,691	51,110
Wheeling Dis.	19,405	24,368	23,409	27,273	24,593
Mahoning Val.	93,635	103,021	102,606	113,533	123,122
Central and North. Ohio..	92,737	117,016	119,163	118,620	113,281
Hocking Valley, Hanging Rock and S. W. Ohio	20,187	19,909	22,376	23,151	29,660
Mich., Minn., Mo., Wis., Colo....	40,029	35,542	39,408	43,673	57,952
Chicago Dist.	152,981	156,537	167,896	171,732	159,395
Alabama	123,301	122,840	126,137	138,929	139,013
Tennessee, Georgia and Texas	18,488	21,159	27,447	33,428	30,260
Totals	1,218,129	1,359,831	1,418,998	1,567,198	1,577,854

Among furnaces blown in in November were one Lackawanna at South Buffalo, one Bethlehem, one Crane and one Thomas Iron Company in the Lehigh Valley, Adrian in western Pennsylvania, Atlantic in the Shenango Valley, one Steelton in the Susquehanna Valley, No. 2 Longdale in Virginia, Dover in Ohio, Belfont, Bird and Ironton (new) in the Hanging Rock Region, Thomas at Milwaukee, Mattie, No. 2 Ohio, Hannah and two Youngstown Sheet & Tube Company (new) in the Mahoning Valley and Johnson City in Tennessee.

The list of furnaces blown out in November includes one Edgar Thomson in the Pittsburgh District, Ella and Fannie in the Shenango Valley, one Cambria in western Pennsylvania, Bristol in Virginia, Hamilton in the Hanging Rock Region, Struthers in the Mahoning Valley, and Embree in Tennessee.

Production of Steel Companies.

Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland,

Lackawanna, Wheeling, Republic, Youngstown Sheet & Tube, Jones & Laughlin, La Belle, Bethlehem, Calumet, Inland, Colorado and Tennessee (Ensley) companies show the following totals of product month by month. We give separately a statement of the output of spiegel-eisen and ferromanganese, which is included for each month in the total production:

Production of Steel Companies.—Gross Tons.

	Fig.—Total production.—			Spiegel-eisen and ferromanganese.	
	1908.	1907.	1908.	1907.	1908.
January	1,358,015	1,406,397	664,415	21,477	20,254
February	1,226,760	1,317,923	745,802	19,444	9,402
March	1,400,395	1,424,827	841,502	31,091	13,750
April	1,333,591	1,446,758	725,548	26,527	12,363
May	1,372,423	1,470,080	759,074	28,822	17,823
June	1,293,437	1,457,230	717,689	30,942	15,958
July	1,323,391	1,452,557	798,639	25,343	10,250
August	1,237,485	1,445,685	897,052	23,696	14,932
September	1,264,380	1,417,153	933,514	30,270	8,938
October	1,452,200	1,514,521	996,481	35,105	12,174
November	1,411,350	1,084,114	981,167	21,861	15,882
December	1,445,528	659,459	.....	19,480	.....

Capacity in Blast December 1 and November 1.

In the following table is given the weekly capacity of coke and anthracite furnaces in blast November 1 and October 1, based largely on their performance in the preceding month in each case:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.		December 1.		November 1.	
	Number	Capacity	Number	Capacity	Number	Capacity
New York:						
Buffalo	15	12	26,395	11	24,550	
Other New York.	7	3	3,816	3	3,822	
New Jersey	8	2	3,797	2	3,724	
Spiegel	2	0	0	0	0	
Pennsylvania:						
Lehigh Valley...	25	10	11,892	7	8,483	
Spiegel	3	2	558	2	535	
Schuylkill Valley.	15	7	12,039	7	10,661	
Low. Susquehanna	7	3	5,210	2	3,614	
Spiegel	1	0	0	0	0	
Lebanon Valley..	10	4	3,986	4	3,495	
Pittsburgh Dist.	45	31	89,650	32	87,599	
Spiegel	3	2	1,810	2	2,555	
Shenango Valley.	20	11	21,687	12	23,247	
W. Pennsylvania.	27	15	21,571	15	23,044	
Maryland	4	2	3,937	2	4,235	
Wheeling District..	14	3	6,251	3	5,698	
Ohio:						
Mahoning Valley.	20	14	32,492	10	26,045	
Central and North. and Michigan.	22	12	29,851	11	28,980	
Hocking Valley, Hang. Rock and S. W. Ohio...	15	9	8,463	8	6,590	
Illinois and Indiana	24	14	35,844	15	38,780	
Spiegel	2	1	1,347	0	0	
Minnesota and Wis- consin	7	4	5,197	3	4,180	
Missouri & Colorado.	7	4	7,118	4	6,216	
The South:						
Virginia	23	10	6,927	10	6,571	
Kentucky	5	1	1,044	1	1,106	
Alabama	46	23	32,438	23	31,388	
Tennessee	18	10	7,292	10	7,077	
Georgia & Texas.	3	1	490	1	490	
Totals	398	210	381,102	200	362,685	

A Record of Active Capacity.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1904:

	Capacity per week.		Capacity per week.
December 1, 1908....	381,102	June 1.....	472,622
November 1.....	362,685	May 1.....	484,031
October 1.....	337,925	April 1.....	484,240
September 1.....	313,112	March 1.....	479,737
August 1.....	284,590	February 1.....	482,156
July 1.....	264,452	January 1, 1906....	463,673
June 1.....	259,284	December 1, 1905....	475,814
May 1.....	268,674	November 1.....	460,449
April 1.....	264,890	October 1.....	445,468
March 1.....	267,437	September 1.....	412,563
February 1.....	241,925	August 1.....	410,088
January 1, 1908....	235,152	July 1.....	408,617
December 1, 1907....	347,372	June 1.....	443,092
November 1.....	491,436	May 1.....	452,031
October 1.....	511,397	April 1.....	439,564
September 1.....	507,768	March 1.....	403,157
August 1.....	513,471	February 1.....	405,792
July 1.....	528,170	January 1, 1905....	377,879
June 1.....	523,220	December 1, 1904....	357,846
May 1.....	524,538	November 1.....	334,249
April 1.....	496,456	October 1.....	319,249
March 1.....	511,035	September 1.....	291,573
February 1.....	492,359	August 1.....	246,092
January 1, 1907....	507,397	July 1.....	272,301
December 1, 1906....	513,860	June 1.....	336,107
November 1.....	500,580	May 1.....	368,244
October 1.....	469,665	April 1.....	337,257
September 1.....	441,426	March 1.....	308,751
August 1.....	449,908	February 1.....	273,692
July 1.....	460,570	January 1, 1904....	185,636

The Austro-Hungarian warship Franz Ferdinand has recently been launched at Trieste. It has a displacement of 14,500 tons, and will carry 32 guns and two submarine lance torpedo tubes. The engines are to work up to 24,000 hp., and the prescribed speed is 20 knots per hour.

NEWS OF THE WORKS.

Iron and Steel.

The Lackawanna Steel Company had five out of its seven furnaces in blast at South Buffalo, N. Y., December 1, as against four in blast November 1.

The Bethlehem Steel Company now has four furnaces in blast at South Bethlehem, Pa., a gain of one in November.

The Pennsylvania Steel Company had two out of its four furnaces at Steelton, Pa., in blast December 1, the No. 1 furnace having been blown in November 13.

The Virginia Iron, Coal & Coke Company expects to put one of its Watts furnaces at Middlesbrough, Ky., in blast in a few days. The Bristol, Va., furnace of this company was blown out November 15.

The new Furnace A of the Youngstown Sheet & Tube Company, Youngstown, Ohio, was blown in November 2 and the new Furnace B November 22.

General Machinery.

The Prescott Mfg. Company, Menominee, Mich., reports much new activity and is now employing its usual number of operatives.

The Sumner Iron Works, Everett, Wash., is improving its plant by the erection of additional buildings, which will increase the available floor space 8300 sq. ft. Considerable machinery has been purchased for the equipment of the new building.

The plant, patents, patterns and assets of the Transit Thresher Company, located at Twenty-eighth street and University avenue, Minneapolis, Minn., have been purchased by the Gas Traction Company, Minneapolis, recently incorporated with a capital stock of \$300,000. The new company will operate the plant as a factory for the building of four-cylinder gasoline engines for threshing and farm traction purposes. The officers of the new company are: P. J. Lyons, president and treasurer; J. W. Muir, vice-president; Chas. T. Thompson, secretary; Fred Glover, general manager.

The Safford-Day Iron Works, Knoxville, Tenn., contemplates moving its present plant to another site where it can have larger facilities, the present location being too small for its growing business. It is understood that negotiations are under way for a tract of 10 acres a short distance from the present plant, and if this property is purchased the company will probably begin building shortly after the first of the year.

A number of companies in the West are either building or preparing to build additions to their plants, among which are the Eagle Iron Works and the Variety Iron Works, Seattle, Wash.; Columbia Steel Company, Pacific Iron Works, Portland Elevator Company, Smith & Watson Iron Works and John Woods Iron Works, Portland, Ore.

The Monon Railroad will rebuild the roundhouse recently burned at Bloomington, Ind., at an estimated cost of \$30,000. W. A. Wallace, Chicago, is chief civil engineer.

The Raber & Lang Mfg. Company has been incorporated at Kendallville, Ind., with \$50,000 capital stock, to manufacture machinery. The incorporators are Oliver P. and Ralph L. Raber and John E. Lang.

Power Plant Equipment.

The American Power Company, Seattle, Wash., incorporated with a capital of \$1,000,000, has been formed for the purpose of generating power for irrigation, electric light and other uses, and will also devote its attention to the acquisition of coal and iron properties in the West.

Arrangements are being made for the construction of an interurban road to be built by the Fresno, Hanford & Summit Lake Interurban Railway Company, Fresno, Cal. The projected line is about 40 miles in length, and will tap seven cities and towns ranging in population from 500 to 40,000. Present plans contemplate the erection of the power plant at Kingsburg, which is about the center of the line.

Preparations are being made by the Husum Power Company, Husum, Wash., to install a hydro-electric plant near the falls of the White Salmon River, to develop about 300 hp. The intention of the company is to supply the city of White Salmon, eight miles away, with current for lighting, and also to supply current to the surrounding ranches for irrigating purposes.

Work on the reconstruction of the Lake Superior Power Company's plant at Sault Ste. Marie, Ont., which was almost destroyed by fire last spring, has been begun, and when restored will provide capacity for the generation of 6300 hp. The foundation, walls and penstocks of the former power building will be utilized in rebuilding, and will be covered by a new roof of reinforced concrete supported by a steel frame. The old turbines will be used, with the exception of one unit, and the water wheel governors and generators are being rebuilt, but new switchboards will be installed. The engineer in charge of this work is L. H. Davis.

The New York & Ontario Power Company, Waddington, St. Lawrence County, N. Y., local representative in charge, George O. Van Kernen, Ogdensburg, N. Y., is planning to develop

30,000 hp. from the rapids in the St. Lawrence River near Ogdensburg. The company proposes to make a first installation of 17,200 hp. and has already secured property rights and permission to use water. It has made application to the Public Service Commission for permission to issue \$1,850,000 bonds and \$664,741 in stock. As soon as permission is granted covering the issuing of stock and bonds the company will proceed to place orders for machinery and equipment. Beverly B. Tucker is consulting engineer and will be in charge of equipment.

Foundries.

The foundry of the Cedarburg Foundry Company, Cedarburg, Wis., was recently completely destroyed by fire. The plant will be rebuilt at once, and efforts will be made to have it ready to resume business about January 15.

The M. L. Oberdorfer Brass Company, Syracuse, N. Y., has let contract for the erection of a one-story brick foundry building, 40 x 100 ft., on East Water street.

The Cascade Foundry Company, Erie, Pa., is having plans prepared for an addition to its foundry at Plum and Nineteenth streets. The building will be 80 x 100 ft., of brick and steel construction, and will be equipped with a 10-ton electric traveling crane, molding machinery and general foundry equipment.

The American Casting Company, Birmingham, Ala., has suspended operations for a week or 10 days for repairs.

Bridges and Buildings.

The W. J. Burns Company, Syracuse, N. Y., has been awarded the contract to construct the steel bascule bridge over the Erie Canal at Lyell avenue, Rochester, N. Y., at a contract price of \$30,970.40. M. Fitzgerald, Hoosick Falls, N. Y., was awarded contract for the construction of a bascule type steel bridge over the Erie Canal at Allen street, Rochester, at his bid of \$29,589.50.

Fires.

The plant of the Wood & Vale Mfg. Company, St. Catharine, Ont., Canada, manufacturer of hoes, rakes, spades and other hardware specialties, was completely destroyed by fire on December 4. The loss is about \$50,000.

Hardware.

The Hubert A. Myers Mfg. Company, Warsaw, Ind., reports that it has a large number of orders for the coming season and that the outlook is promising. The company manufactures lawn swings, ladders, hay cars, &c.

Miscellaneous.

Charles E. Shiveley, Richmond, Ind., representing E. F. Claypool and other Indianapolis capitalists, has purchased the plant of the Indiana Mfg. Company, at Richmond, at receiver's sale, for \$97,000. The plant will continue in operation. Its chief product is brass beds. The reincorporated company has \$50,000 capital.

Extensive additions are being made to the shops of the Packard Motor Car Company, Detroit, Mich., which will still further increase the capacity of the plant, now covering nearly 15 acres. The new buildings will be of reinforced concrete, quadrangular in form, with ample open space on all sides. Beginning with a factory floor space of 100,000 sq. ft. in 1903, the plant has by successive additions been enlarged to six times its original size.

Sparling & Holland, Brooklyn, N. Y., who have for some time been conducting a high grade millwright business, have incorporated and have decided to manufacture many of the products that they have handled in connection with their millwright work, including pulleys, hangers, couplings, gears and other elevating and conveying machinery, as well as leather belting and lace leather. They will occupy a plant of their own some time next year. The officers of the company are Philip R. F. Sparling, president and treasurer; Laura Sparling, vice-president, and William J. Holland, secretary and manager.

Incorporated with a capital stock of \$30,000, of which \$15,000 is paid in, the Caldwell Mfg. Company of St. Louis, Mich., has been organized to manufacture the Caldwell elevator platform truck, and expects to begin business within the next 30 days. The officers of the company are James K. Wright, president; A. F. Wright, secretary; W. H. Caldwell, vice-president; Geo. Davidson, treasurer.

Edgar M. Cain & Co., Wilmington, Del., patentees of an automatic train stop and whistle signal, have incorporated with the following officers: President, U. G. Glick, Wilmington, Del.; vice-president, H. A. Cain, Philadelphia, Pa.; general manager, E. L. Cain, Wilmington; treasurer, James Scarlett, Philadelphia, and secretary, Edward W. Scarlett, Philadelphia.

J. B. Fowler of Los Angeles, Cal., and J. R. Fowler of Anderson, Ind., are organizing the Fowler Railway Car Company, with offices at Chicago and Anderson. The plant will probably be established in Anderson. The inventors say it will be possible to drive the Fowler car at 70 to 90 miles an hour.

The City Council of Connersville, Ind., will receive bids until January 12 for the construction of a waterworks system, with a capacity of 3,000,000 gal. a day, and if a filter is used it must be a mechanical filter with a capacity of 4,000,000 gal. a day. The owners of the plant must lease it to the city for 10 to 25

years as agreed upon and give a bond of \$100,000 guaranteeing the plant to do the work required.

The Oswald Motor Company, Goshen, Ind., manufacturer of gasoline motors and transmission, which has been in rented quarters since its organization almost two years ago, has moved into its own cement fireproof building, 30 x 160 ft., with a testing room 20 x 36 ft. The company is adding \$2000 worth of new machinery. The capacity of the plant is sold to July 1, 1909. Its contracts are with automobile manufacturers exclusively.

The Colonial Wood Products Company has been incorporated in Ontario by Henry B. Eshelman of the Pettebone-Cataract Paper Company, Niagara Falls, and others, and will build a plant at Thorold, Ont., for the manufacture of wood pulp products.

The Queen's Run Fire Brick Company, Lock Haven, Pa., has been running since January 1, 1908, at 75 per cent. of capacity, but before that time was running to full capacity night and day turn. About October 1 the company had some fair sized orders and figured that with improvement in business which it expected after the election it could run for a good period to capacity. Night and day turn was put on at that time, but as a matter of fact its business fell off after November 1 and has not been as good since that time as it was in the summer.

The Mica Insulator Company, Dock street and Villa road, Schenectady, N. Y., has retained Consulting Engineer and Architect W. L. Stoddard, Union square, New York, to prepare plans for construction of new factory building to be erected at Schenectady. The building will be four stories, of reinforced construction and will cost approximately \$140,000. Bids for building and equipment will be called for the coming year.

The Auto Parts Mfg. Company, Muncie, Ind., has been incorporated, with \$15,000 capital stock, to buy and sell automobile parts and supplies in connection with the manufacture of automobiles. The incorporators are F. M. Boyer, A. Boyer, J. P. Kendel and A. W. Tyler.

The Leather Tire Company, Niagara Falls, N. Y., recently incorporated, will erect a two-story brick factory building, 50 x 100 ft., on Whirlpool street, north of the New York Central Railroad tracks. The company will engage in the manufacture of a combination metal and leather tire for the protection of rubber automobile tires.

The Pittsford Metal Ware Company, Pittsford, N. Y., has been incorporated, with \$25,000 capital stock, to manufacture metal ware specialties. The incorporators are Henry H. Hilsiker, Thomas Sheehan and John A. Agate of Pittsford, Joseph E. Byrnes, Charles H. Rich and David N. Salisbury of Rochester, and J. D. Smith of Buffalo.

The American Engineering Company, Terminal-Traction Building, Indianapolis, Ind., has secured the contract for building a 196-mile electric railroad from Des Moines to Sioux City, Iowa.

The DeKleist Musical Instrument Mfg. Company, North Tonawanda, N. Y., and the Rudolph Wurlitzer Company, Cincinnati, Ohio, have consolidated under the name of the Rudolph Wurlitzer Mfg. Company, with a capital stock of \$1,000,000. The company proposes to erect a large three-story brick addition to the North Tonawanda plant. Construction will be started early in the coming year.

Letters patent were issued at Montreal, Canada, December 2, to A. J. Estes, G. S. Hart, F. H. Mackey, R. C. Grant and W. G. Pugsley of Montreal to organize under the name of the Canadian Palace Car Company, with capital of \$1,300,000, to manufacture parlor, dining and sleeping cars in Canada, under rights obtained from the American Parlor Car Company of New York.

Rhodes-Curry & Co., Amherst, N. S., are rebuilding their passenger car erecting shop which was recently destroyed by fire. None of the buildings containing machinery were damaged and no new machinery will be required, the burned building being equipped with only two or three small machines operated by electricity. Work at the plant is proceeding as usual, and it is expected that the new shop will be completed inside of four weeks.

The Green Bay Cornice & Corrugating Company, Green Bay, Wis., will build a new plant, 159 x 198 ft., one story.

The National Roller Works, Superior, Wis., reports much activity in its line. The company has the contract for the erection of large grain tanks at the Marsden Feed Company's plant at Superior, and is also working on a large order for coal buckets for the Pittsburgh Coal Company.

The Pneumatic Oven Company has been organized at Milwaukee, Wis., with a capital stock of \$100,000, by A. Edward Koch, Henry J. Gamm and Charles C. Mayhew.

Contracts have been let by the Santa Fé System for the rebuilding of a roundhouse, coal chutes, sand house and water service at Amarillo, Texas.

The recent fire at the plant of the Snyder & Baker Stove Works, Belleville, Ill., destroyed only the polishing and plating departments. The loss was not very large, and a satisfactory settlement having been made with the insurance company, these

departments are being rebuilt and will be ready for operation in a few weeks.

The C. J. Tagliabue Mfg. Company, New York, has started a factory at Cleveland, Oswego County, N. Y., for the manufacture of thermometers.

The Gandy Belting Company, Baltimore, Md., will build an additional factory, 90 x 100 ft., of mill construction, to be equipped with exhaust steam heating plant, electric light plant, elevators, belt stretching and other machinery.

Practically no machinery was destroyed in the recent fire at the plant of the J. G. Brill Company, Philadelphia, Pa., only a part of the lumber department being damaged.

A company is being organized at Carmel, Ind., to build a packing plant, to include an ice and cold storage plant, to cost \$100,000. Among the stockholders are Myers & Myers, C. Y. Foster, Dr. K. C. Hershey, Henry A. Roberts, George Bowen and F. W. Johnson.

The City Ice Company has been organized at Ft. Wayne, Ind., with \$30,000 capital stock and will build an artificial ice plant. Edward Marquis will be manager. R. J. Spencer, Marion, Ind., is at the head of the company.

Press reports to the effect that the Pittsburgh-Westmoreland Coal Company would after January 1 commence the erection of a large new coke plant, to cost \$500,000, adjacent to its Acme works near Monongahela City, Pa., are greatly exaggerated. The company will shortly place a contract for the grading for the location of a new coke works, but the erection of the ovens has not been definitely decided upon and will not be for some time yet.

The Pressed Steel Car Company, Pittsburgh, is substituting electricity for steam power in its steel car works at McKee's Rocks. A new electric power house has been completed and a large amount of electrical equipment has been installed. Already over 30 punching machines formerly run by steam power are operated by electricity.

Russian Iron and Steel Production.—The production of iron ore in Russia in 1907 was 4,227,419 metric tons, as against 3,873,356 tons in 1906, 4,942,182 tons in 1905 and 5,160,990 tons in 1904. In addition to the above the exports of manganese ore from Poti amounted to 881,322 tons in 1907, against 464,016 tons in 1906. The exports of iron ore from South Russia to Germany in 1907 were 1,613,000 metric tons, compared with 535,000 tons in 1906 and 373,000 tons in 1905. The pig iron production in Russia last year was 2,820,604 metric tons, as compared with 2,691,606 tons in 1906. The production of steel ingots and castings was 2,823,028 metric tons, of which 524,796 tons was by the Bessemer and Thomas processes, 2,129,503 tons by the Siemens-Martin process and 168,739 tons by the crucible and other processes. In 1906 the total by all processes was 2,643,027 tons. From 1904 to 1907 the decrease was 211,883 tons. The production of steel rails in 1907 was 311,806 metric tons, against 271,739 tons in 1906. Russia's production of coal in 1907 was 26,023,344 metric tons.

The Standard Tool Company, Cleveland, Ohio, will greatly enlarge the capacity of its plant about January 1 by occupying several adjoining buildings owned by this company in which the plant of the Standard Welding Company was formerly located. The buildings are being overhauled and fitted up with the most modern appliances for a manufacturing plant. An electric freight elevator is being installed, and some additional power equipment is being added. Some new special machinery will be installed, but this will be built by the company. The enlargement of the plant will give the company 60,000 sq. ft. additional floor space. The company reports a gradual improvement in orders, and additional men are being added to its working force.

The Empire Meter & Engine Company of Canada, Ltd., Winnipeg, Canada, has been incorporated with a capital stock of \$125,000, under the Manitoba Joint Stock Companies act. The organization of the company has not yet been completed by the election of officers, but plans are being prepared for the erection of a manufacturing plant at Winnipeg, whose product will be water meters and water works supplies. Owing to the lateness of the season active construction work will not be undertaken until next spring. The incorporators of the company are: Geo. L. Rice, Geo. Irving and Geo. Goodfellow of Chicago, Fred J. Darch, London, Ont.; W. R. K. Magill, Winnipeg.

The Iron and Metal Trades

Pig Iron Production Increased 4 Per Cent. in November.

November production of Pig Iron, according to the returns furnished to *The Iron Age*, footed up to 1,577,854 gross tons, compared with 1,567,198 tons in October and 1,218,129 tons in July. We are producing now at the rate of 52,595 tons per day, of Coke and Anthracite Iron, against 50,554 tons in October and 36,444 tons in June. Thus the gain in the daily rate was about 4 per cent, in November, over October, and about that rate of gain over November is indicated for December, according to the furnaces active on the first of this month.

It is somewhat difficult to judge whether the melt is increasing at this rate. The only indication is that generally speaking consumers are quite urgent for deliveries, and are frequently adding to former purchases.

Buying by larger interests has been somewhat sporadic, but there are indications that some who have fought the advance all along are surrendering.

During the past 10 days some heavy purchases have been made in the Birmingham District. One interest has contracted for 30,000 to 40,000 tons of low grade Irons on the \$13 basis, and one sale of No. 2 Foundry Iron, involving 10,000 tons, was made. The number of makers who are willing to sell for forward delivery on the \$13 basis is narrowing and a more general adherence to a higher level is foreshadowed.

In eastern Pennsylvania an accident to one of the local furnaces has led to a flurry in Basic Pig and some round sales have followed.

The Rail makers and the Pennsylvania Railroad have come so close together in the matter of specifications that an early placing of the orders for an aggregate of about 160,000 tons is expected within the next 10 days. The placing of the Pennsylvania order is usually the signal for similar action on the part of many other roads, and the movement is therefore watched with unusual interest. It is stated that the question still at issue is in regard to the rejection of Rails which have failed to pass the new drop tests. The railroad engineers first demanded that the whole batch represented by the Rail showing weakness be rejected, and when that was refused offered to accept them provided that each rail of such batch be specially marked. It is this proposition which is now being considered.

As indicating how the views of railroad engineers are undergoing a change, we may note that the New Haven road is now in the market for a lot of Open Hearth Rails for which the specifications call for carbon up to 1 per cent. and phosphorus down to 0.02 per cent.

Quite a large business has been done in Track Material. Chicago reports purchases made by a number of leading roads there of Spikes and Bolts which aggregate 150,000 kegs.

With the approach of the new year more interest is developing in Wire Rods. Some good business has been done in the Chicago District, and there are some large inquiries in the Pittsburgh market for delivery during the first half of next year.

In Steel Billets and Sheet Bars some interesting contracts have also been closed. Among them is one, made in the Wheeling District, involving 6000 tons per month over a period of six months.

Pittsburgh is to furnish the material for an additional lot of 1300 Steel cars just ordered by the Canadian Pacific road.

Comparatively only a small part of the large contracts for Structural Material which have been pending has been allotted. The contractor for the Chicago City Hall, which requires 11,000 tons, has been selected, and it is expected that the material will be promptly awarded.

The American Bridge Company is to build the 12-span bridge in Alaska, calling for 3500 tons, which the Gugenheim interest needs for its road.

The markets for Old Material are firm and in some sections display a rising tendency. One eastern Pennsylvania open hearth interest has purchased during the past week upward of 25,000 tons of melting scrap and some other negotiations of magnitude are pending.

The activity in the Brass and Copper rolling mills is reflected in an unusual spread between Lake and Electrolytic Copper, the former selling at 14½ cents, while the latter is available at 14¼ cents. A larger difference would of course lead to a diversion from the former to the latter, particularly since the Wire trade is not yet what it should be, even relatively.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 9, 1908.	Dec. 2, 1908.	Nov. 11, 1908.	Dec. 11, 1907.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia.....	\$17.25	\$17.25	\$17.00	\$18.50
Foundry No. 2, Southern, Cincinnati.....	16.25	16.25	15.75	17.50
Foundry No. 2, Local, Chicago.....	17.00	17.00	16.50	19.00
Basic, delivered Eastern Pa.....	16.75	16.50	16.00	....
Basic, Valley Furnace.....	15.50	15.50	14.50	....
Bessemer, Pittsburgh.....	17.40	17.40	16.40	19.90
Gray Forge, Pittsburgh.....	15.15	15.15	14.90	18.40
Lake Superior Charcoal, Chicago	19.50	19.50	19.50	25.00
BILLETS, &c., Per Gross Ton:				
Steel Billets, Pittsburgh.....	25.00	25.00	25.00	28.00
Forging Billets, Pittsburgh.....	27.00	27.00	27.00	30.00
Open Hearth Billets, Phila.....	26.20	26.20	26.20	30.00
Wire Rods, Pittsburgh.....	33.00	33.00	33.00	34.00
Steel Rails, Heavy, at mill.....	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago....	15.50	15.50	15.00	13.00
Steel Rails, Melting, Phila.....	16.75	16.25	15.50	11.50
Iron Rails, Chicago.....	19.50	19.50	18.00	15.50
Iron Rails, Philadelphia.....	21.00	20.50	20.25	17.50
Car Wheels, Chicago.....	16.00	16.00	15.25	22.00
Car Wheels, Philadelphia.....	16.00	16.00	15.00	19.00
Heavy Steel Scrap, Pittsburgh..	16.50	16.50	16.00	13.50
Heavy Steel Scrap, Chicago.....	15.25	15.25	14.50	11.50
Heavy Steel Scrap, Philadelphia	16.75	16.25	15.50	11.50

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia.	1.50	1.50	1.45	1.75
Common Iron Bars, Chicago....	1.50	1.50	1.50	1.75
Common Iron Bars, Pittsburgh.	1.50	1.50	1.40	1.60
Steel Bars, Tidewater, New York	1.56	1.56	1.56	1.76
Steel Bars, Pittsburgh.....	1.40	1.40	1.40	1.60
Tank Plates, Tidewater, New York	1.76	1.76	1.76	1.86
Tank Plates, Pittsburgh.....	1.60	1.60	1.60	1.70
Beams, Tidewater, New York...	1.76	1.76	1.76	1.86
Beams, Pittsburgh.....	1.60	1.60	1.60	1.70
Angles, Tidewater, New York...	1.76	1.76	1.76	1.86
Angles, Pittsburgh.....	1.60	1.60	1.60	1.70
Skelp, Grooved Steel, Pittsburgh	1.45	1.45	1.45	1.70
Skelp, Sheared Steel, Pittsburgh.	1.50	1.50	1.50	1.80

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, Black, No. 28, Pittsburgh.	2.50	2.50	2.50	2.60
Wire Nails, Pittsburgh.....	1.95	1.95	1.95	2.05
Cut Nails, Pittsburgh.....	1.75	1.75	1.75	2.00
Barb Wire, Galv., Pittsburgh...	2.40	2.40	2.40	2.50

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York.....	14.50	14.50	14.75	13.62½
Electrolytic Copper, New York..	14.12½	14.25	14.50	13.50
Spelter, New York.....	5.15	5.20	5.05	4.50
Spelter, St. Louis.....	5.00	5.05	4.90	4.35
Lead, New York.....	4.27½	4.35	4.42½	4.00
Lead, St. Louis.....	4.15	4.20	4.30	3.75
Tin, New York.....	29.10	29.40	30.75	28.40
Antimony, Hallett, New York...	8.12½	8.12½	8.12½	8.75
Nickel, New York.....	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York...	\$3.89	\$3.89	\$3.89	\$4.09

Chicago.

FISHER BUILDING, December 9, 1908.—(By Telegraph.)

The new orders for finished Iron and Steel entered last week include few transactions involving important quantities, but no halt is observed in specifications, which on Steel Bars are exceptionally good, and on all other lines are coming out fairly well. Of leading interest were the contracts for Spikes and Bolts placed by five of the Western roads with the Illinois Steel Company. Three of these amounted in the aggregate to 112,000 kegs, and while the amounts were not specified for the remaining two the total of all would probably be around 150,000 kegs. The business taken by fabricators was made up of small jobs, none of the larger projects under consideration having been closed. By a vote of the Chicago City Council, the general contract for the construction of the new City Hall, requiring 11,000 tons of Structural Material, has been awarded to the Noel Construction Company, Baltimore.

Pig Iron.—It is evident from the light business booked last week by local selling agencies that consumers of Foundry Iron generally have withdrawn from the market. Whatever first and second quarter requirements are yet uncovered will hardly be considered until after the turn of the year. Only scattered lots of small size were included in the week's business, the most of them for shipment through the first half. Inquiries have dropped off considerably, and no lots of important size are concerned in those now coming out. The situation has again resolved itself into a waiting game,

in which buyers and sellers seem equally content to defer action pending future developments. A good many consumers would doubtless come into the market for second half requirements at current prices, if Iron was available for that period. There are, in fact, several inquiries of this character floating about, but the furnace interests either decline to quote or else name figures materially higher than consumers will consider. As matters now stand, there is no prospect of the immediate establishment of a mutually acceptable price basis for second half bookings. There is no change in the prices held by either Northern or Southern producers. At least two of the leading Southern interests are selling through the first half at \$13, Birmingham, while others are naming this price only for first quarter shipments, and are asking \$13.50, Birmingham, for second quarter. The local Northern furnaces are selling first quarter Iron at \$17, at furnace, but for exclusively second quarter business are quoting \$18. The indications are that there will be some falling off in the foundry melt between now and the first of the year, and requests to hold up deliveries until after that time are more numerous. Altogether, market conditions are about what might naturally be expected in view of the late buying movement, and the usual slack up that comes with the holiday season. The following quotations are for December delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$19.50 to \$20.00
Northern Coke Foundry, No. 1.....	17.50 to 18.00
Northern Coke Foundry, No. 2.....	17.00 to 17.50
Northern Coke Foundry, No. 3.....	16.50 to 17.00
Northern Scotch, No. 1.....	18.00 to 18.50
Southern Coke, No. 1.....	17.85 to 18.35
Southern Coke, No. 2.....	17.35 to 17.85
Southern Coke, No. 3.....	16.85 to 17.35
Southern Coke, No. 4.....	16.35 to 16.85
Southern Coke, No. 1 Soft.....	17.85 to 18.35
Southern Coke, No. 2 Soft.....	17.35 to 17.85
Southern Gray Forge.....	15.85 to 16.35
Southern Mottled.....	15.60 to 16.10
Malleable Bessemer.....	17.00 to 17.50
Standard Bessemer.....	17.90 to 18.40
Jackson Co. and Kentucky Silvery, 6 %	19.90 to 20.40
Jackson Co. and Kentucky Silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky Silvery, 10 %	22.90 to 23.40

(By Mail.)

Billets and Rods.—While no lots of importance were included in last week's transactions for Forging Billets, slight improvement is noted in the number of small orders coming into the market. These are comprised principally of carload lots representing the requirements of machinery builders of various kinds. We are advised that prices are now being regularly maintained at the base price of \$28.50, Chicago. Backed by a vigorous demand for Wire products, Wire Rods are moving in fairly good volume. Several new contracts ranging from 1000 to 2000 tons, together with one of 5000 tons, were included in the entries made last week by the principal interest. Prices continue firm, and we quote as follows: Bessemer, \$33; Basic, \$34; Chain, \$33, all at Pittsburgh.

Rails and Track Supplies.—The various lots of new rail tonnage under consideration are still hanging fire, and no closures are reported. A few small orders, from miscellaneous sources, for Heavy Rails, constitute the full measure of activities in this line as far as new business is concerned. More interest is being displayed by the railroads in track supplies, with the result that the Spike and Bolt departments of the Joliet plant are well supplied with orders, the bookings of the past few weeks being sufficient to provide the Spike mill for a run of three or four months, and the Bolt mill for six months. Besides a liberal amount of specifications, which were entered last week by the Illinois Steel Company, several new Spike and Bolt orders were taken, the most notable of which was one from the Missouri Pacific Railroad for 35,000 kegs of Bolts and 35,000 kegs of Spikes; also 25,000 kegs of Spikes and Bolts from the Northern Pacific and 7000 kegs from the Wisconsin Central. Contracts were also closed with the Great Northern Railroad and the Soo Line, but the tonnages in these instances were not specified. Angle Bars are not sharing the activity with the other fastenings, and orders for them are coming in slowly. Business in Light Rails is holding up, orders for 2000 tons having been booked in the first week of the present month for rolling at the South Works. The advances in the price of Re-rolling Steel Rails is reflected in the firming up of Light Rails, prices which in this territory are rarely shaded beyond \$1 a ton. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.50c.; car lots, 1.60c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.15c. to 2.25c., base, Square Nuts, and 2.30c. to 2.40c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., \$26; 20-lb., \$27; 16-lb., \$28; 12-lb., \$29. Standard Sections, Bessemer, \$28; Open Hearth, \$30, on lots of 500 tons and over; on smaller lots, \$2 a ton extra.

Structural Material.—None of the projects now under consideration involving large tonnages of Structural Material was included in the contracts closed last week. Quite a number of small jobs, however, were secured by fabricators. Those reported aggregate about 3200 tons, and were comprised as follows: For the Ordway Hotel, St. Paul, 1500

tons, to be erected by A. Bolter & Son, Bethlehem Shapes being specified; for the new Featherstone Foundry plant, Chicago, 800 tons, taken by the Kenwood Bridge Company; for the First National Bank Building, Houston, Texas, 373 tons, placed by James Stewart, general contractor, with the Virginia Bridge Company; 200 tons for a bridge over the Tensas River in Arkansas, secured by the Pennsylvania Steel Company; 150 tons for a grand stand to be erected in the American League Ball Park, St. Louis, and 100 tons for a gravel handling plant at Baton Rouge, to be fabricated by the American Bridge Company; 194 tons for a new factory building to be erected in Omaha by the Loose-Wiles Cracker & Candy Company, taken by the A. E. Shorthill Company, Marshalltown, Iowa; 400 tons for a Pueblo, Colo., Court House, was awarded to the Des Moines Bridge & Iron Company, and 268 tons for the Vermont Building, Salt Lake City, was taken by the Minneapolis Steel & Machinery Company. No action was taken by the City Council at its last meeting regarding the award of the contract for the construction of the new Chicago City Hall, but it is understood that the question will again be taken up this week. Specifications for plain material are coming in fairly well, especially from the car shops. Prices from store are 1.95c. to 2c. Mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.78c.; Angles, 3 to 6 in., 1/4-in. and heavier, 1.78c.; larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 15 in., 1.88c.; Zees, 3 in. and over, 1.78c.; Tees, 3 in. and over, 1.83c.

Plates.—As compared with other mill products, the demand for Plates is lagging. The industries depended upon to supply Plate orders are not, as yet, going ahead fast enough to warrant their placing large orders for Plates. Business has, however, improved somewhat in the past few weeks, and some of the smaller mills have secured a fair amount of business, but the situation as a whole is not marked by a degree of improvement that promises the employment of full mill capacities in the immediate future. Prices have firmed up considerably, and but little complaint is heard of irregularities, which some time ago were a conspicuous feature of the market. We quote mill shipments as follows: Tank Plates, 1/4-in. and heavier, wider than 6 1/4 and up to 100 in. wide, inclusive, car lots, Chicago, 1.78c.; 3-16 in., 1.88c.; Nos. 7 and 8 gauge, 1.93c.; No. 9, 2.03c.; Flange quality, in widths up to 100 in., 1.88c., base, for 1/4-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.88c.; Flange quality, 1.98c. Store prices on Plates are as follows: Tank Plates, 1/4-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.25c.; 72 in. wide, 2.30c. to 2.40c.; No. 8, up to 60 in. wide, 2.10c. to 2.15c.; Flange and Head quality, 0.25c. extra.

Sheets.—A fairly good movement in Sheets is reported, although signs are not wanting which point to some slowing up through the approaching holiday season. All of the orders for immediate shipment of Galvanized and Light Black Sheets are being held pretty closely to actual present requirements, and no change in this respect is looked for until after the first of the year. Store business is effected to some extent by the same influences, and shipments from jobbers' stocks are moving in moderate volume. Mill prices are being maintained with more regularity and we are advised that no concessions of consequence are being made from established schedules. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 and 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue Annealed, No. 10, 2.15c.; No. 12, 2.20c.; No. 14, 2.25c.; No. 16, 2.35c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—Very little new business in Steel Bars is coming into the market, owing to the fact that the requirements of the consumers are generally well covered by contracts placed sometime ago. Specifications against these contracts, however, continue to come out in satisfactory volume, in consequence of which, the mills of the leading interest are running practically full. But little, if any, improvement is noted in the demand for Iron Bars, which is confined principally to orders for immediate consumption. All of the Iron Bar and re-rolling Steel mills in this district are going this week. Of the Republic Steel & Iron Company's mills, the Tudor Works at St. Louis has three trains on, with the Sylvan, at Moline, and the East Chicago plant each operating two trains. The Interstate Steel & Iron Company's mill is scheduled for a full week's run, though not to full capacity. Notwithstanding the higher level of values in mill Scrap, no advances have been made by the Western mills on Bar Iron, prices on which, however, are being firmly maintained. Quo-

tations, Chicago, are as follows: Steel Bars, 1.58c., with half extras; Iron Bars, 1.50c.; Hoops, No. 13 and lighter, 1.98c., full extra Hoop card; Bands, No. 12 gauge and heavier, 1.58c., half extra, Steel Bar card; Soft Steel Angles and Shapes, 1.68c., half extras. Store prices are as follows: Bar Iron, 2c. to 2.15c.; Steel Bars, 1.90c. to 2c.; Steel Bands, 1.90c., as per Bar card, half extras; Soft Steel Hoops, 2.25c. to 2.35c., full extras.

Merchant Pipe.—There is nothing in present conditions to warrant the expectation of an accelerated movement of Merchant Pipe, since there is no incentive at present for jobbers to increase their stocks. Much of the outside work calling for the use of Pipe is suspended on account of cold weather, and will not be pushed again until spring opens. In the meantime buying will probably be of a hand to mouth character, with no features of special interest. The following mill discounts are quoted: Black Pipe, $\frac{3}{4}$ to 6 in., 73.2; 7 to 12 in., 70.2; Galvanized, $\frac{3}{4}$ to 6 in., 63.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 73 per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in. About three points above these prices is asked for Iron Pipe.

Boiler Tubes.—Some fair sized orders for Locomotive Tubes have been entered within the past few days, and while not notably large, the demand is better at present than it has been at any time in the past eight months. This is due chiefly to the greater amount of repair work being done by the railroads. New business in Merchant Tubes is light, but it is expected that after the first of the year the situation will be improved by more liberal stock orders from jobbers. Mill quotations for future delivery, on the base sizes, are as follows: $2\frac{3}{4}$ to $4\frac{1}{4}$ in., inclusive, Steel Tubes, 63.2; Iron, 50.2; Seamless, 50.2; $2\frac{1}{2}$ in. and smaller, and lengths over 18 ft., and $2\frac{1}{2}$ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to $1\frac{1}{2}$ in.	35	35	35
$1\frac{1}{2}$ to $2\frac{1}{4}$ in.	50	35	35
$2\frac{1}{4}$ in.	52 $\frac{1}{2}$	35	35
$2\frac{1}{2}$ to 5 in.	60	47 $\frac{1}{2}$	47 $\frac{1}{2}$
6 in. and larger.	50	35	..

Merchant Steel.—While no new business of any consequence is being placed, specifications against contracts are being received by the mills in fair volume. The usual lethargy incident to the holiday season is being felt to some extent, chiefly with respect to the demand from jobbers who are generally preparing for the taking of inventories. We quote as follows: Planished or Smooth Finished Tire Steel, 1.78c.; Iron Finish, up to $1\frac{1}{2}$ x $\frac{1}{2}$ in., 1.73c., base, Steel card; Iron Finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, 1.58c., base, Tire card; Channels for solid Rubber Tires, $\frac{3}{4}$ to 1 in., 2.08c., and $1\frac{1}{2}$ in. and larger, 1.98c.; Smooth Finished Machinery Steel, 2.08c.; Flat Sleigh Shoe, 1.63c.; Concave and Convex Sleigh Shoe, 1.83c.; Cutter Shoe, 2.05c.; Toe Calk Steel, 2.13c.; Railroad Spring, 1.98c.; Crucible Tool Steel, $7\frac{1}{4}$ c. to 8c., and still higher prices are asked on special grades. Cold Rolled Shafting in car lots and over, 57 per cent. off; in less than car lots, 52 per cent. off, with carload freight allowed within base territory.

Metals.—The larger consumers of Copper are, as a rule, pretty well covered by contracts placed some weeks ago, against which they are specifying freely. Buying of this and other Metals by the smaller interests is limited to small lots for present use, so that there is comparatively little new business coming out. The strong statistical showing of the available supply of Pig Tin has had a weakening effect on prices which are about 1c. below last week's quotations. Old Metals reflect in a general way the movement of Ingot Metals, and the market is steady as to price, but only fairly active. Quotations are as follows: Casting Copper, $14\frac{1}{4}$ c.; Lake, $14\frac{1}{4}$ c. to $14\frac{1}{2}$ c., in car lots, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; Pig Tin, car lots, $31\frac{1}{2}$ c.; small lots, $34\frac{1}{2}$ c.; Lead, Desilverized, 4.45c. to 4.55c., for 50-ton lots; Corroding, 4.70c. to 4.80c., for 50-ton lots, in car lots, $2\frac{1}{4}$ c. per 100 lb. higher; Spelter, 5.10c. to 5.25c.; Cookson's Antimony, 10 $\frac{1}{2}$ c., and other grades, 9 $\frac{1}{4}$ c. to 10 $\frac{1}{4}$ c.; Sheet Zinc is \$7, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, $13\frac{1}{4}$ c.; Heavy Copper, 13c.; Copper Bottoms, $11\frac{1}{4}$ c.; Copper Clips, 13c.; Red Brass, 12c.; Yellow Brass, 9 $\frac{1}{2}$ c.; Light Brass, 6 $\frac{1}{4}$ c.; Lead Pipe, 4.35c.; Zinc, 3 $\frac{3}{4}$ c.; Pewter, No. 1, 21c.; Tin Foil, 23c.; Block Tin Pipe, 26c.

Cast Iron Pipe.—Beyond the usual routine of small orders, there was but little tonnage booked by the foundries in the past week. No awards of the city of Detroit's requirements have thus far been made. Lettings are advertised by the city of St. Paul for 2000 tons on December 14, and by Indianapolis for 1500 tons on December 15. The general trend of inquiries indicate the development of a more active demand soon after the opening of the new year. We quote nominally per ton, Chicago, as follows: Water Pipe, 4 in., \$27; 6 to 12 in., \$26; 16 in. and up, \$25, with \$1 extra for Gas Pipe.

Old Material.—In spite of a limited demand from consumers through the past week, the market as a whole holds firm, and the small amount of material offered by the railroads has commanded good prices. In the two lists closed there was a little more than 4000 tons, and the Melting Steel grades and Re-rolling Rails were bid up to top prices by dealers, although a fair portion of it is understood to have been sold direct to consumers. Borings and Turnings are the only grades on which there is any evidence of reaction. These were advanced out of line with other material by the recent demand from the Pittsburgh District, which has now subsided, and they will likely recede to their relative level. About 18,500 tons are included in the railroad offerings out for disposal this week, which are as follows: The Santa Fe, 2500 tons; Chicago, Milwaukee & St. Paul, 2500 tons; Wisconsin Central, 500 tons, and the Baltimore & Ohio, 8500 tons. In the latter list is a lot of 2500 tons of Re-rolling Steel Rails. The following prices are per gross ton, f.o.b. Chicago:

Old Iron Rails	\$19.50 to \$20.00
Old Steel Rails, re-rolling	17.25 to 17.75
Old Steel Rails, less than 3 ft.	15.50 to 16.00
Relaying Rails, standard sections, subject to inspection	22.50 to 23.50
Old Car Wheels	16.00 to 16.50
Heavy Melting Steel Scrap	15.25 to 15.75
Frogs, Switches and Guards, cut apart	15.25 to 15.75
Mixed Steel	12.25 to 12.75

The following quotations are per net ton:

Iron Fish Plates	\$17.50 to \$18.00
Iron Car Axles	21.00 to 21.50
Steel Car Axles	18.50 to 19.00
No. 1 Railroad Wrought	15.00 to 15.50
No. 2 Railroad Wrought	14.00 to 14.50
Springs, Knuckles and Couplers	14.50 to 15.00
Locomotive Tires, smooth	14.75 to 15.25
No. 1 Dealers' Forge	11.75 to 12.25
Mixed Busheling	9.25 to 9.75
Iron Axle Turnings	9.00 to 9.50
Soft Steel Axle Turnings	9.00 to 9.50
Machine Shop Turnings	9.00 to 9.50
Cast Borings	7.75 to 8.25
Mixed Borings, &c.	7.75 to 8.25
No. 1 Mill	9.00 to 9.50
No. 2 Mill	8.00 to 8.50
No. 1 Boilers, cut to Sheets and Rings	10.50 to 11.00
No. 1 Cast Scrap	14.00 to 14.50
Stove Plate and Light Cast Scrap	12.25 to 12.75
Railroad Malleable	14.00 to 14.50
Agricultural Malleable	11.75 to 12.25
Pipes and Flues	11.00 to 11.50

Buffalo.

BUFFALO, N. Y., December 8, 1908.

Pig Iron.—Although the tonnage sold the past week is fully up to the average of the preceding few weeks, there has been a slackening in general buying due undoubtedly to the fact that some furnaces are so heavily sold that they have advanced their prices to a point which consumers consider prohibitive under present conditions. The demand for the lower grades of Foundry Iron is increasing, however, on account of the high price at which Scrap Iron is held. No. 3 Foundry and Gray Forge are becoming scarce and prices have advanced sharply, although these grades can probably be placed at something less than the prices shown in the appended quotations. The following prices fairly represent the market:

No. 1 X Foundry	\$16.25 to \$16.75
No. 2 X Foundry	15.75 to 16.25
No. 2 Plain	15.50 to 15.75
No. 3 Foundry	15.50 to 15.75
Gray Forge	15.25 to 15.75
Basic	16.00 to 16.50
Malleable Bessemer	17.00 to 17.50
Charcoal	20.75 to 21.25

Old Material.—The market is dull, with but little demand from consumers who consider the schedule of prices adhered to by the dealers to be prohibitive. In most instances dealers are holding strongly for the higher range of the schedule, and but little tonnage is changing hands. We quote dealers' prices per gross ton, f.o.b. Buffalo, as follows:

Heavy Melting Steel Scrap	\$15.50 to \$16.00
No. 1 Railroad Wrought	17.00 to 17.75
No. 1 Railroad and Machinery Cast Scrap	14.75 to 15.50
Old Steel Axles	19.00 to 20.00
Old Iron Axles	22.50 to 23.50
Old Car Wheels	16.75 to 17.75
Railroad Malleable	14.50 to 15.00
Boiler Plate	13.00 to 13.50
Locomotive Grate Bars	12.50 to 13.00
Pipe	12.50 to 13.00
Wrought Iron and Soft Steel Turnings	9.00 to 9.50
Clean Cast Iron Borings	8.50 to 9.00
No. 1 Busheling Scrap	14.25 to 14.75

Finished Iron and Steel.—Business is quiet, with some improvement in orders for Bar products for immediate deliveries, and with orders for small Shapes and railroad materials running about the same as for the past three weeks. Very little business is developing for Structural Material for the current month, and no activity is looked for until after the first of the year.

Pittsburgh.

PARK BUILDING, December 9, 1908.—(By Telegraph.)

Pig Iron.—While inquiries have fallen off, and little new buying is being done, the market is firm, and furnaces are not disposed to shade prices to get business. Most of the Valley furnaces have a good deal of Iron sold ahead, which consumers are taking out at a fairly satisfactory rate, and little Iron is pressing the market. We quote Basic Iron at \$15.50, Valley furnace, for first quarter delivery, and \$15.75 to \$16 for first half. Standard Bessemer Iron is quiet, but is held firmly at about \$16.50, at furnace, while Malleable Bessemer is about \$16 at furnace. We quote No. 2 Foundry at \$15.50, and Forge at \$14.25, Valley furnace, or \$15.15, Pittsburgh. We note a sale of 500 tons of Basic for first quarter at \$15.50, Valley furnace, and 500 tons of Malleable Bessemer at \$16, Valley furnace.

Steel.—Makers of Steel state that consumers are specifying more freely against contracts for Billets, Forging Billets and Sheet Bars and shipments of Steel by the mills to consumers are heavier than for some time. We quote Bessemer and Open Hearth Billets, 3 $\frac{1}{2}$ in. and larger, up to and including 0.25 carbon, \$25; 0.26 to 0.60 carbon, \$1 extra; over 0.60 carbon, \$2 extra, all f.o.b. Pittsburgh. For Wheeling, Martins Ferry, Follansbee, Newcastle, Sharon, Steubenville and Washington (Pa.) delivery, half the freight, or 50c. additional, is charged. Sheet and Tin Bars in random lengths are \$27.50, f.o.b. Pittsburgh. Forging Billets take \$2 advance over Rolling Billets.

(By Mail.)

While general conditions continue quiet, a material betterment in the demand for all kinds of Iron and Steel products is expected after January comes in. The Pig Iron output is now larger than at any time in the past year, the Mahoning and Shenango valleys showing a large increase. Only four stacks in the Youngstown District are idle—Tod Furnace of the Youngstown Steel Company, Struthers Furnace, one Andrews & Hitchcock stack, and the No. 4 at the Ohio works of the Carnegie Steel Company. It is believed that the present output of Pig Iron is fully as heavy as the consumption, if not larger, and with a number of stacks ready to blow in higher prices are not likely in the near future. The large Steel interests report that Billets and Slabs and Sheet Bars are moving out more freely on specifications against contracts. Structural Steel has fallen off, but Sheets and Tin Plate are more active. While actual orders this month may show a decrease as compared with November, this will be due entirely to the fact that this month is the inventory period.

Ferromanganese.—The market is quiet, but prices are firm. We quote 80 per cent. foreign Ferro at \$44 to \$44.50, seaboard, plus the freight rate of \$1.90 a ton, for Pittsburgh delivery.

Ferrosilicon.—We note sales of some 250 tons of 50 per cent. Ferrosilicon on the basis of about \$62.50, Pittsburgh. We quote the market at \$62.50 to \$63, Pittsburgh.

Wire Rods.—Some fairly large inquiries for Rods for delivery over first half of the year are in the market, and some business of this character has already been closed. Consumers continue to specify quite freely against contracts. The market is firm, and we quote Bessemer Rods at \$33, Chain Rods at \$33, and Basic Rods at \$34, Pittsburgh.

Muck Bar.—Owing to the higher prices ruling for Forge Iron, Muck Bar has further advanced, and we now quote best grades of Muck Bar, made strictly from all Pig Iron, at \$28 to \$28.50, Pittsburgh. A sale of about 250 tons of high grade Bar is reported at the higher price.

Skelp.—Mills rolling Grooved and Sheared Iron Plates are reported to be well filled up, some fairly large contracts having been placed in the last month against which consumers are specifying freely. We quote Grooved Steel Skelp at 1.45c. to 1.50c.; Sheared Steel Skelp, 1.50c. to 1.60c.; Grooved Iron Skelp, 1.75c., and Sheared Iron Skelp, 1.85c., f.o.b. Pittsburgh. A sale is reported of about 500 tons of Sheared Iron Skelp, at 1.85c., Pittsburgh.

Steel Rails.—Within a few days it is likely that definite announcement will be made of the placing of a contract by the Pennsylvania Railroad for 150,000 tons or more of Steel Rails for 1909 delivery. An agreement has been reached between this road and the Rail makers, and the closing of the contract may be expected to be followed by large orders from other roads. The Wabash Terminal has placed 500 tons with the Carnegie Steel Company, and the Pittsburgh Railways Company about the same amount. The Carnegie Steel Company has also booked about 1300 tons of Light Rails. The Nos. 1 and 3 mills at Edgar Thomson Works are running to possibly 40 per cent. of capacity. A

good tonnage in both Light Rails and Standard Sections for export is being placed, the Carnegie Steel Company having recently secured some good orders. Makers of Light Rails rerolled from Old Rails continue to sell at \$2 to \$3 a ton under Rails rolled from Billets. Prices on new Light Rails, rolled from Billets, are as follows: \$25 for 25 to 45 lb. Sections, with \$1 advance for 20 lb., \$2 advance for 16 lb., and \$3 advance for 12 lb. Standard Sections are \$28, at mill, and Angle Splice Bars, 1.65c., at mill.

Structural Material.—At a meeting held in this city late in November the National Association of Structural Steel Fabricators was formed, at which Horace E. Horton was elected chairman and B. L. Worden secretary. This organization is composed of practically all the leading Structural Steel fabricators, and has been organized to bring about better conditions in their trade. Business in this line continues quiet, orders booked in November showing a marked falling off as compared with October. It is believed, however, that contracts for a good quantity of Shapes will be closed early in the new year, as bids have gone in on a large amount of new work. We quote, f.o.b. mill, Pittsburgh: I-Beams and Channels, 3 to 15 in., inclusive, 1.60c., net; I-Beams over 15 in., 1.70c., net; H-Beams over 8 in., 1.80c.; Angles, 3 to 6 in., inclusive, $\frac{1}{4}$ in. and up, 1.60c., net; Angles, over 6 in., 1.70c., net; Angles, 3 x 3 in. and up, less than $\frac{1}{4}$ in., 1.50c., base, half extras, Steel Bar card; Tees, 3 in. and up, 1.65c., net; Zees, 3 in. and up, 1.60c., net; Angles, Channels and Tees under 3 in., 1.50c., base, half extras, Steel Bar card; Deck Beams and Bulb Angles, 1.90c., net; Hand Rail Tees, 3c., net; Checkered and Corrugated Plates, 3c., net.

Plates.—The demand is showing distinct betterment, orders being placed with the large makers of Plates being heavier now than at any time in the past year. The Canadian Pacific Railroad has given another order to the American Car & Foundry Company for about 1300 Steel cars, the Plates and Shapes for which will be rolled by the Jones & Laughlin Steel Company. The market is firmer, practically all the new business being taken at regular prices, which are as follows: Tank Plates, $\frac{3}{4}$ in. thick, 6 $\frac{1}{4}$ in. up to 100 in. wide, 1.60c., base, at mill, Pittsburgh. Extras over this price are as follows:

Tank, Ship and Bridge quality, $\frac{1}{4}$ -in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base. Steel Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered $\frac{1}{4}$ -in. Plate. Steel Plates over 72 in. wide must be ordered $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on Plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. Plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates..	.20
Still Bottom Steel.....	.40
Marine Steel.....	.40
Locomotive Firebox Steel.....	.50
Shell grade of Steel is abandoned.	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.50c., f.o.b. Pittsburgh.

Sheets.—A distinctly better demand is observed for both Galvanized and Black Sheets and more new orders are being placed with the mills than probably at any other time this year. The American Sheet & Tin Plate Company is now operating to about 65 per cent. of capacity, and the leading outside Sheet mills are running to larger capacity than for some months, two or three concerns advising us they are operating practically full. Prices are much firmer and very little if any cutting is being done. For shipment from mill regular prices are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets, Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c.; No. 28, Painted Roofing Sheets, \$1.75 per square, and Galvanized Roofing Sheets, No. 28, \$3.10 per square, for 2 $\frac{1}{2}$ -in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—The demand continues unusually heavy for this season of the year. The leading mills are booking a good many large orders, and, it is claimed, at full prices. The American Sheet & Tin Plate Company and the leading outside Tin Plate makers are steadily increasing their active

capacity. The outlook for the next three or four months is decidedly good. Regular prices are being absolutely maintained. We quote: \$3.70 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Iron and Steel Bars.—Specifications against contracts for Steel Bars continue to come into the mills very freely, and shipments are correspondingly heavier. The Steel Bar trade is fast getting back into normal conditions, the leading makers now operating to 75 per cent. or more of capacity. The situation in Iron Bars is fairly active, some fair sized orders coming in, which, with specifications against contracts, keep the mills operating to about 50 per cent. of capacity. We quote Iron Bars at 1.42c., Pittsburgh, for Western shipment, or 1.60c., Chicago, while the price for delivery in the Pittsburgh District is 1.50c. Steel Bars are firm, at 1.40c., Pittsburgh, for base sizes.

Hoops and Bands.—This is the fag end of the season in this trade, but as soon as the mills have announced their prices on Hoops and Bands for 1909 delivery it is expected that some very heavy contracts will be placed by the leading consumers. Regular prices are reported as being maintained as follows: Steel Hoops, 1.80c., base, full Hoop card prices. Steel Bands, 1.40c., base, half Steel card extra, all f.o.b. cars, Pittsburgh, in carload lots, for delivery during 1908.

Railroad Spikes.—Reports are that heavy orders for Railroad Spikes have been placed by two or three of the leading roads, and that some very large additional business is pending. The demand for the smaller sizes continues active, and the mills are filled up for three or four weeks. Prices are firm, and we quote: Standard sizes, 4½ x 9-16 in., at \$1.70, and the smaller sizes at \$1.80 per 100 lb., in carload and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—Few new orders are coming in, but specifications against contracts are being received by the mills quite freely. However, jobbers are holding back to some extent, not wishing to increase stocks until after the first of the year. Several large orders for Shafting for delivery over first quarter and first half of the year have been placed, and we are advised at full prices. We quote Cold Rolled Shafting at 57 per cent. off in carloads and 52 per cent. in less than carloads, delivered in base territory. Regular prices on Merchant Steel, which are being shaded to some extent, are as follows: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 1.90c. to 1.95c.; Railroad Spring Steel, 1.60c. to 1.75c., the higher prices being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron finish, 1½ x ½ in. and heavier, 1.40c.; under 1½ in., 1.55c. Planished Tire Steel is 1.60c., all f.o.b., at mill.

Spelter.—Prices have again advanced, and prime grades of Western Spelter are held at about 5c., East St. Louis, equal to 5.12½c., Pittsburgh.

Merchant Pipe.—Reports that inquiries are in the market for 100 miles of line Pipe for one interest and 30 miles of 6-in. and 8-in. for another are probably untrue. Leading mills say they have no such inquiries and have not heard of them. The Gulf Refining Company recently bought about four miles of 3 to 10 in. Pipe, and is in the market for about four miles of 2-in. 4-lb. The general demand for Pipe in merchant sizes is fairly active when it is considered that this is the off season of the year. It is estimated that about 70 per cent. of the mill capacity is active at present. The mills are strictly maintaining prices on both Iron and Steel Pipe. Discounts on Steel Pipe, ¾ to 6 in., to the large trade, are 76 and 5 per cent. off list. Regular discounts are as follows:

Merchant Pipe.		Jobbers, carloads, Steel.	
		Black.	Galv.
¾ to ¾ in.	.....	.67	.51
¾ in.	.....	.69	.55
¾ in.	.....	.71	.59
¾ to 6 in.	.....	.75	.65
¾ to 12 in.	.....	.72	.57
Extra strong, plain ends:			
¾ to ¾ in.	.....	.60	.48
¾ to 4 in.	.....	.67	.55
¾ to 8 in.	.....	.63	.51
Double extra strong, plain ends:			
¾ to 8 in.	.....	.56	.45
Discounts on Genuine Iron Pipe are as follows:			
		Black.	Galv.
¾ to ¾ in.	.....	.65	.53
¾ in.	.....	.67	.57
¾ in.	.....	.69	.59
¾ to 6 in.	.....	.73	.63
¾ to 12 in.	.....	.70	.55
Extra strong, plain ends:			
¾ to ¾ in.	.....	.58	.46
¾ to 4 in.	.....	.65	.53
¾ to 8 in.	.....	.61	.49
Double extra strong, plain ends:			
¾ to 8 in.	.....	.54	.43

Boiler Tubes.—Several of the railroads are placing some fairly large orders for Tubes for repair work, but as yet

little new business has been closed for delivery into next year. The demand for Merchant Tubes continues quiet and shipments by the mills are light. Prices are reported to be somewhat firmer. For Merchant Tubes in small lots, on which an extra 5 per cent. is allowed in carloads, discounts are as follows:

Boiler Tubes.		
	Iron.	Steel.
1 to 1½ in.	.....42	47
1½ to 2¼ in.	.....42	59
2½ in.	.....47	61
2½ to 5 in.	.....52	65
6 to 13 in.	.....42	59
2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.		
2½ in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—Several dealers state that consumers have asked them to defer shipments on Scrap already sold, and other negotiations have been held up until after the first of the year. This is due to the fact that consumers of Scrap are pretty well covered, and do not want to take in any more material this month than they can avoid. The general condition of the trade is sound, there apparently being places to put all the Scrap available, and dealers are very firm as to prices. The embargo on Scrap destined for the Allegheny Steel Company, at Brackenridge, Pa., has not yet been lifted, and this has caused a slight weakness in prices of Borings and Turnings. The company was a heavy buyer some time ago, and several dealers are now compelled to find other places to put the material intended for such shipment. A large consumer of Heavy Steel Scrap in the Wheeling District is reported to have bought 4000 to 5000 tons at about \$16.75, delivered. Prices on Rerolling Rails are slightly weaker. No sales of moment have been made during the week, and dealers quote about as follows: Heavy Steel Scrap, \$16.50 to \$16.75, for Pittsburgh, Sharon, Steubenville or Leechburg, Pa., delivery; for delivery at Bonesen, Pa., which takes a higher freight rate, \$17 has been quoted. Cast Iron Borings are \$11 to \$11.25; Bundled Sheet Scrap, \$13.50 to \$13.75; No. 1 Busheling Scrap, \$14.75 to \$15; No. 2, \$10.75 to \$11; No. 1 Cast Scrap, \$14.75 to \$15; Iron Axles, \$24 to \$24.50; Sheet Bar Crop Ends, \$18.50 to \$18.75; Rerolling Rails, \$18, delivered Cambridge, Ohio, and \$18.50 to \$19, delivered Cumberland, Md.; Low Phosphorus Melting Stock, \$18 to \$18.25; Steel Axles, \$19.50 to \$20; Scrap Bars, \$13 to \$13.25; Machine Shop Turnings, \$12.25 to \$12.50; Railroad Wrought Scrap, \$16.75 to \$17; Railroad Malleable Scrap, \$15 to \$15.50; Iron Rails, \$18.75 to \$19, and Locomotive Tires, \$17 to \$17.25, all per gross ton, f.o.b. Pittsburgh, unless otherwise stated.

Coke.—The tone of the Coke market is decidedly firm. There is a good deal of inquiry for Furnace Coke for first half of the year shipment. One leading interest that recently came into the market as a large consumer of Coke has closed with a prominent Connellsville operator for upward of 16,000 tons a month for first half of next year. The price is said to have been about \$1.90 a ton at oven. The seller of this Coke closed with the same buyer some time ago for part of its requirements, and, desiring to have its entire tonnage, made a lower price than otherwise would have been made. Operators are adhering pretty closely to \$2 per net ton for Connellsville Furnace Coke for first half delivery, while for prompt shipment \$1.85 to \$1.90 is being paid. We note a sale of about 4000 tons for December and January shipment at \$1.90, at oven. Connellsville 72-hr. Foundry Coke is very firm and is held at \$2.25 to \$2.40, at oven. The Coke makers outside of the Connellsville region are making slightly lower prices for their Furnace and Foundry Coke. Last week there were 19,829 ovens in the two Connellsville regions in blast, and 18,191 were idle. The output was 229,199 tons, an increase over the previous week of about 10,000 tons. It would not be surprising if a shortage of Coke would come during this winter, as many plants are crippled for lack of water and besides a shortage in labor may develop.

Birmingham.

BIRMINGHAM, ALA., December 7, 1908.
Pig Iron.—The sales reported in this market in the week just ended aggregate approximately 30,000 tons. With the exception of 5000 tons for spot delivery, shipments specified against engagements recorded cover the first quarter, but in one or more round tonnage considerations there is probably a provision whereby deliveries can be extended to cover the entire first half if so desired. By reason of the fact that but one of the leading producing interests has been solicitous of orders for a week or 10 days, the recent activity has resulted in practically no shading of established quotations. Among the sales reported, a lot of 10,000 tons on a basis of \$13 per ton, Birmingham, for No. 2 Foundry is notable. A lot of 5000 tons, for spot delivery, referred to above, is understood to have been placed at figures slightly above the \$13 schedule. This order is known to have been refused by the largest producer quoting on a basis of \$13. Comparatively small lots of Clifton High Manganese Iron are reported sold at \$14, Birmingham. The producer accredited with the majority of recent engagements reports a favorable comparison of order-book requirements with the probable

output for such a period that an advance from the \$13 schedule within the coming week is not improbable. With such action quotations would be established on a basis of \$13.50, although the tonnage offered for early shipment would probably increase materially. There are no available figures as to the extent the output of present active producing capacity has been taken care of, but of the four additional furnaces now ready for operation it is not anticipated that any will be blown in before January 1. The indications are favorable, however, for a continuance to some extent of the activity just experienced and significant additions to order-book requirements.

Cast Iron Pipe.—The business transacted in this market the past week was composed of minor orders, hardly sufficient to test the strength of quotations, but the manifested attitude of Southern producers is indicative of a more satisfactory condition. There has been no addition to the list of important lettings actually in sight, although a number of extensions and improvements are under consideration by gas and water companies, and the market for municipal bonds is such that considerable activity is anticipated soon after the inception of the new year. There has been an advance of \$1 to \$2 per ton in quotations on Cast Iron Soil Pipe, with indications favorable for the maintenance of values thus established. The accumulation of this material on yards of producers has been considerably reduced without an increase in the rate of production. We quote Water Pipe as follows, per net ton, carload lots, f.o.b. cars here: 2 to 6 in., \$24; 8 to 12 in., \$23; over 12 in., average \$22, with \$1 per ton extra for Gas Pipe.

Old Material.—The buying of carload lots for prompt shipment is the feature of this market, but the aggregate movement is fairly satisfactory. An improvement in the demand for Light Cast is noted, and consumers of Steel and Wrought manifest more interest as to future requirements. Dealers are in some cases indifferent of commitments and contemplate an advance in asking prices. We quote as follows, per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$14.50 to \$15.00
Old Iron Axles.....	16.00 to 17.00
Old Steel Axles.....	13.00 to 13.50
No. 1 Railroad Wrought.....	13.50 to 14.00
No. 2 Railroad Wrought.....	10.50 to 11.00
No. 1 Country Wrought.....	11.00 to 11.50
No. 2 Country Wrought.....	9.50 to 10.00
No. 1 Machinery.....	11.00 to 11.50
No. 1 Steel.....	10.00 to 10.50
Stove Plate and Light Cast.....	9.50 to 10.00
Cast Borings.....	5.00 to 5.50

Cleveland.

CLEVELAND, OHIO, December 8, 1908.

Iron Ore.—There is more Ore on the docks than at this time a year ago, and as furnace yards are well filled it is expected that the shipments from the docks during the winter will be light. At a meeting of the Executive Committee of the Lake Carriers' Association, held in Detroit December 3, resolutions were adopted declaring that the depression in the lake trade during the past season was but a temporary condition, and the committee declared that it had such confidence in the recovery of business in 1909 that the rate of wages paid the present season should be maintained the coming season. They have been the same as in the prosperous year 1907. The committee also announced that it had decided to adopt the plan the association had in contemplation in 1901 to better the condition of officers and seamen. The open shop policy will be carried out, and in planning for the welfare of its employees the association will establish club rooms at the principal lake ports, provide a system of certificates of recommendation for employees, provide better protection of life and property afloat, provide death expense relief in case of death while on duty and furnish funds for transportation and for lost effects in case of shipwreck. Ore prices at Lake Erie ports are as follows: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old Range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—Sales of Foundry Iron have been limited to a few small lots, the largest being about 500 tons. There are scarcely any inquiries. The majority of the furnaces are well sold up for the first quarter and are holding quite firmly at \$16, Valley furnace, for No. 2 Foundry. Resale Iron has been offered by dealers at somewhat lower prices. A lot of No. 2 Foundry for December and January delivery is being offered by a Pittsburgh broker at \$15.50, Valley furnace. Among the sales of the week were several small lots of No. 2 strong, at \$16, local furnace, for first quarter and half, for shipment outside of this territory. A small tonnage of No. 2 was sold by a local furnace at \$16.75, furnace, for Cleveland delivery in the first half. This interest is holding No. 2 at \$16.50, at furnace for No. 2 for outside shipments, and \$17.25, delivered Cleveland, for the second quarter. Shipping orders for Foundry Iron on contracts continue to come in fairly well, and a local interest reports that several consumers have asked shipments anticipated this month of Iron bought for January delivery. Inquiries for Basic Iron continue fairly good, and the price seems to be

quite firm at \$16, Valley furnace. A local interest reports that it rejected an offer at that price of 2000 tons per month for delivery during the first quarter. For December delivery we quote, delivered, Cleveland, as follows:

Bessemer	\$17.40 to \$17.90
Northern Foundry, No. 1.....	17.25 to 17.50
Northern Foundry, No. 2.....	16.75 to 17.00
Northern Foundry, No. 3.....	16.25 to 16.50
Gray Forge.....	15.00 to 16.00
Southern Foundry, No. 2.....	17.35
Jackson County Silvery, 8 per cent. Silicon.....	20.05

Coke.—The market is quieter, but prices continue firm. We quote Standard Connellsville Furnace Coke at \$1.90, at oven, for spot shipment, and \$2 to \$2.10 for first half delivery. For prompt shipment we quote Connellsville 72-hr. Foundry Coke at \$2.15 to \$2.25, at oven. For first half delivery this grade is held at \$2.25 to \$2.50, at oven.

Finished Iron and Steel.—Business is somewhat quieter. Inventory time is at hand, and consumers are holding off as much as possible in placing orders. A contract for another lake freighter was closed during the week, the Great Lakes Engineering Works of Detroit getting an order from the Inland Navigation Company of Hamilton, Ont., for a 500-ft. freighter for delivery next spring. The American Shipbuilding Company closed an additional contract for 1300 tons of Plates for a boat previously under contract. The leading interest closed a contract with a jobber during the week for 6500 tons of Bars, and reports other contracts for 1000 tons of Bars and Hoop Skelp and 500 tons of Shapes, Plates and Bars. The demand for Iron Bars shows a little improvement, owing to the receipt of specifications on some low priced contracts that expire the first of the year. Local mills and jobbers are now quoting Iron Bars at 1.40c., Pittsburgh, for Cleveland delivery. The demand for Plates is very light, but the price is now being fairly well maintained. Sheets are firmer, and there is very little price cutting. Jobbers report a fair demand for Blue Annealed Sheets. There is an improvement in the demand for Light Rails on contracts, and some new orders are being taken for car lots. Owing to the higher prices that the reolling mills are forced to ask as the result of the increased cost of their material, the most of the orders are now for new Rails. The demand for Structural Material is very light, but a number of building projects are coming up that indicate considerable improvement early in the spring. Jobbers are getting a fair volume of orders from stock. We quote: Iron Bars, 1.50c., Cleveland, for car lots; Steel Bars, 1.60c., Cleveland, for car lots, half extras; Beams and Channels, 1.70c., base, Cleveland, and Plates, 1/4-in. and heavier, 1.70c., Cleveland. We quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 28, 2.60c.; Galvanized, No. 28, 3.65c. Jobbers quote Iron Bars out of stock at 1.55c. to 1.60c., and Steel Bars at 1.60c. to 1.70c. Beams and Channels from warehouse are 2c., and Plates, 1/4-in. and heavier, 1.90c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.80c. Warehouse prices on Boiler Tubes, 2 3/4 to 5 in., are 65 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 71 per cent. discount.

Old Material.—The market is rather quiet, and prices show a weakening tendency. The disappearance of the firmness that had prevailed for some time is attributed partly to the fact that dealers who had sold short have covered, and this supporting tendency is now absent, and partly because consumers are now taking inventories. The embargo placed on Borings and Turnings for shipment to the Pittsburgh District has helped to weaken prices, and those grades have declined about 50c. a ton. Local mills have good sized stocks on hand, and the few inquiries that are coming in are for small lots. The railroad lists this week include about 6000 tons to be sold by the Baltimore & Ohio, in which are 3000 tons of Rails and 750 tons of Wrought. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$17.00 to \$17.50
Old Iron Rails.....	19.50 to 20.00
Steel Car Axles.....	20.50 to 21.00
Old Car Wheels.....	16.00 to 16.50
Heavy Melting Steel.....	15.50 to 16.00
Relaying Rails, 50 lb. and over.....	22.00 to 23.00
Railroad Malleable.....	14.50 to 15.00
Agricultural Malleable.....	13.50 to 14.00
Light Bundled Sheet Scrap.....	9.50 to 10.00

The following prices are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$20.00 to \$20.50
Cast Borings.....	8.50 to 9.00
Iron and Steel Turnings and Drillings.....	9.50 to 10.00
Steel Axle Turnings.....	11.00 to 11.50
No. 1 Busheling.....	13.50 to 14.00
No. 1 Railroad Wrought.....	15.50 to 16.00
No. 1 Cast.....	14.00 to 14.50
Stove Plate.....	12.00 to 12.50
Bundled Tin Scrap.....	9.00

Peter A. Frasse & Co., 94 Fulton street, New York, have opened a branch office and warehouse at 50 and 52 Exchange street, Buffalo, N. Y. The warehouse has 10,400 sq. ft. of floor surface, and will be used for carrying a full line of steel tubing, tool steel and other steel specialties.

Cincinnati.

CINCINNATI, OHIO, December 9, 1908.—(By Telegraph.)

All eyes are turned to the new year, and for the remainder of the month little is expected, even in the Pig Iron trade, as requirements for the first half are now about satisfied, and it is generally admitted that there is no spot demand. For the first time in many months evidences begin to accumulate of an improvement in the foundry melt, which means in turn that industries using castings are beginning to order. Optimistic reports of tool manufacturers are based on inquiries that suggest some important deliveries early next year. Structural Steel and car orders are coming out and a demand for railroad equipment is in evidence. Dealers in finished Iron and Steel generally report business very quiet, and not expected to improve during December, while collections are slow. Scrap dealers are holding well together and still forcing prices upward, with little or no business from the consumer. The outlook for plenty of domestic and established foreign business after the first of the year has been a factor in declaring off the contemplated invasion of South America by local tool and machinery men, most of them electing to remain at home to take care of it.

Pig Iron.—More difference of opinion, apparently, exists among the Iron manufacturers of the South than at any time since the election, particularly in the matter of prices on next year's deliveries. While some interests announce that they are sold up for the first half, save enough to take care of regular customers sparingly at \$13.50, Birmingham, others are willing to book business through the entire half year at \$13. One of the largest interests in the South advised its local agents to withdraw all quotations on everything from No. 3 Foundry down to low grades. The largest Pipe interest is credited with having taken an immense tonnage of low grades from Southern furnaces within the past week or so. Word comes also from the East from representatives of a large selling interest that its furnaces have sold up clean on low grades for the first half. Northern Irons are firm, at \$15.50, at furnace, for No. 2, for deliveries through the first quarter, and some for the first half with \$16 asked. It appears that \$15.75 is the minimum for the first half alone. On a firm offer it is believed that \$15.50 can be shaded a little for No. 2 on spot business. High silicons, Ohio Silveries, are still quotable at \$18.50, at furnace, for 8 per cent., with some furnaces asking \$19 for the second quarter. The reluctance of furnaces to quote on second half business is general on all grades, there apparently being but one interest in evidence willing to name a price of \$14.50, which is said to have been turned down by the consumer. There is some demand for Charcoal Irons, which are still quotable as indicated in the table below, although one Southern manufacturer who uses a large part of his furnace output in his business announces a raise of \$1, making his price at furnace \$21 instead of \$20. Other selling agents announce prices unchanged, but firm. The foundry melt is increasing slowly, one agency announcing sales to foundries here aggregating 1000 tons on Monday. The largest inquiry heard here to-day is for 1000 tons to analyze 1 to 1.50 in silicon; manganese, 0.30 and over; phosphorus 1 and less, and sulphur 0.075 and under, which would rank about No. 4 Foundry in the South and Forge in the North, for delivery first half, to a Dayton manufacturer. A Southern Indiana manufacturer wants 1000 tons of Nos. 2 and 3, Southern Foundry, for the first half. For prompt delivery, and extending through the first quarter we quote, f.o.b. Cincinnati, based on freight rates of \$3.25 from Birmingham, and \$1.10 from the Hanging Rock District, as follows:

Southern Coke, No. 1.....	\$16.75 to \$17.25
Southern Coke, No. 2.....	16.25 to 16.75
Southern Coke, No. 3.....	15.75 to 16.25
Southern Coke, No. 4.....	15.25 to 15.75
Southern Coke, No. 1 Soft.....	16.75 to 17.25
Southern Coke, No. 2 Soft.....	16.25 to 16.75
Southern Coke, Gray Forge.....	14.75 to 15.25
Southern Mottled.....	14.50 to 15.00
Ohio Silvery, 8 per cent. Silicon.....	19.60
Lake Superior Coke, No. 1.....	17.10 to 17.60
Lake Superior Coke, No. 2.....	16.60 to 17.10
Lake Superior Coke, No. 3.....	16.10 to 16.60
Standard Southern Car Wheel.....	22.25 to 23.25
Lake Superior Car Wheel.....	21.75 to 22.75

(By Mail.)

Coke.—There is still considerable contracting going on, the feature of the week being probably the small hurry shipments ordered to take care of the holiday season of a week or 10 days, when workmen will be off in the districts which feed the Southern furnaces. Such deliveries must be made prior to December 22. One order of 5000 to 6000 tons was placed this way during the week. The Hamilton Iron & Steel Company is buying about 15,000 tons for December and January delivery to its furnace at Hamilton, Ohio. For early delivery, Virginia Coke is quotable at \$1.85 to \$1.90, at oven, the latter price for the first quarter and \$2 firm for the first half. Pocahontas manufacturers are asking \$1.90 to \$2 for the first half, with some dealers shading the first named price a trifle for spot business on Furnace grades, and for Foundry business \$2.25 is the price on forward shipments. Prices on Connellsville grades vary considerably; on Fur-

nace from \$1.85 to \$2 for the first half, and Foundry \$2.15 to \$2.50, depending on brands and shipments.

Finished Iron and Steel.—The market is exceedingly dull, and not much improvement is expected before the middle of January. Some fairly good sales of Bars and blacksmith and wagon makers' materials are noted, but the demand for twisted Steel Bars for concrete work and Structural Material in general is very light. Collections are slow. No change is to be noted in prices on any item. Bids will be received within a few days by the Reliance Engineering Company for 300 hp. boiler, motors, feeding systems, piping, &c., for the new plant of the Cincinnati Soap Company, just completed on Spring Grove avenue. Prices, f.o.b. Cincinnati, are as follows: Iron Bars, carload lots, 1.55c., base, with half extras; small lots from store, 1.85c., base, half extras; Steel Plates carload lots, 1.75c., base, with half extras; small lots from store, 1.85c., base, half extras; Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, 1/4-in. and heavier, carload lots, 1.85c.; small lots from store, 2c.; Blue Annealed Sheets, heavy, No. 16, carload lots, 2.15c.; small lots from store, 2.50c.; No. 14, carload lots 2.05c.; small lots from store, 2.40c.; No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; No. 12, carload lots, 2c.; small lots from store, 2.30c.; Sheets (Light), Black, No. 28, carload lots, 2.65c.; Galvanized Sheets, No. 28, carload lots, 3.70c.; Steel Tire 4-in. and heavier, carload lots, 1.95c.; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.20c.

Old Material.—Dealers are holding firm to advanced prices on all items, with consumers taking little interest, the latter maintaining that prices are entirely too high, considering conditions in the trade. A local dealer shipped to points in this State over 4000 tons of Heavy Melting Steel during the past week. An inventory taken by one of the large dealers December 1 showed between 75,000 and 80,000 tons of Scrap in his yards, and another is credited with 100,000 tons and over. There is some interest in sidetrack Rails at \$21, while Rails graded as No. 1 Relayers under Hunt's inspection are quoted at \$24. We quote as follows, f.o.b. Cincinnati:

No. 1 R. R. Wrought, net ton.....	\$13.50 to \$14.50
Cast Borings, net ton.....	5.50 to 6.00
Heavy Melting Steel Scrap, gross ton..	15.50 to 16.00
Steel Turnings, net ton.....	6.60 to 7.00
No. 1 Cast Scrap, net ton.....	13.00 to 14.00
Burnt Cast, net ton.....	9.00 to 10.00
Old Iron Axles, net ton.....	16.75 to 17.75
Old Iron Rails, gross ton.....	15.00 to 16.00
Old Steel Rails, short, gross ton.....	13.00 to 14.00
Old Steel Rails, long, gross ton.....	13.00 to 14.00
Relaying Rails, 56 lb. and up, gross ton	21.50 to 22.50
Old Car Wheels, gross ton.....	15.00 to 16.00
Low Phosphorus Scrap, gross ton.....	14.00 to 15.00

St. Louis.

ST. LOUIS, December 7, 1908.

Pig Iron.—The current demand for Pig Iron is coming mainly from small consumers in the country. One house reports sales as follows: 200 tons, shipment over second quarter of 1909; 300 tons, shipment over first half, and 300 tons, shipment over second quarter, all Northern Iron. Another house reports inquiries pending for 2000 to 2500 tons from contract buyers, shipment over first half of 1909, and is experiencing difficulty in securing offerings, as many Southern producers are unwilling to book orders for the second quarter. In the case of small buyers, immediate shipment is generally required, though some are desirous of buying for shipment over the first quarter. Notwithstanding the falling off in the demand, there are no indications of weakness, and we quote Southern No. 2 Foundry, f.o.b. Birmingham, as follows: Immediate shipment and first quarter, \$13; second quarter, \$13.50. Ohio Iron is strong at \$15.50 to \$16 for No. 2, f.o.b. Ironton; Northern Silvery, 8 per cent. Silicon, \$18.50 to \$19, f.o.b. Jackson County furnaces.

Coke.—There is an undercurrent of strength and a very general belief that with the turn of the year the price of Coke will be somewhat higher. While interest in the market is manifest through a fairly large number of inquiries, none of the leading sales agencies reports any large sales. Business seems to be confined to small transactions, which, while fairly numerous, do not aggregate more than a moderate tonnage. The customers of the various houses are taking Coke on contract in good shape and in some cases are desirous of anticipating time of shipment. It would appear that all the low sellers have withdrawn from the market and it is noted that with some of the principal producers there is a disposition to hold from contracting at present. We quote, f.o.b. Connellsville, 72-hr., \$2.25 to \$2.75, for immediate and future shipment up to July, 1909—the lower price for early, and the higher price for later shipment.

Finished Iron and Steel.—The call for Structural Iron continues fairly good both from local and country territory, but the sales are in small lots. The principal new structure coming up is the Shepley Building, to be erected at once at 703-11 Locust street. The building is to occupy

a lot 100 x 120 ft., and it will be two stories high. Mauren, Russell & Garden are the architects. Plans are being prepared by the same architects for a five-story apartment house to be erected on Von Verson and Hamilton avenues, to be known as Elizabeth Court, and will cost about \$200,000. The Singer & Halbohr Real Estate Investment Company will invite bids from contractors as soon as the architects have completed the plans. There is a fair inquiry for Bars from jobbers and manufacturers. In railroad track material, Bolts, Spikes, Tees, Angles, Channels, &c., there is quite a liberal inquiry. Standard Rails are being inquired for. The leading Steel interest has closed a contract with the Terminal Railroad Association of St. Louis for 2800 tons. The lumber interests are still in the market for Light Rails.

Old Material.—Dealers express disappointment with the week's business, the demand from consumers having been lighter than was expected. Some of the trade attribute this to a disinclination to pay the prices asked, while others advance the belief that foundrymen and rolling mill operators are not at present in urgent need of supplies. Dealers, however, are trading to a considerable extent among themselves. While there are no large sales to report, the market is moving along and prices for all kinds of Old Material are fairly firm. None of the railroads is making offerings, but it is reported that one of the principal local trunk lines will be out with a list next week. We quote as follows, f.o.b. St. Louis, per gross ton:

Old Iron Rails.....	\$17.00 to \$17.50
Old Steel Rails, rerolling.....	15.50 to 16.00
Old Steel Rails, less than 3 ft.....	14.25 to 14.75
Relaying Rails, standard sections, subject to inspection.....	24.00 to 24.50
Old Car Wheels.....	16.00 to 16.50
Heavy Melting Steel Scrap.....	14.75 to 15.25
Frogs, Switches and Guards, cut apart.....	14.75 to 15.25
Mixed Steel.....	10.25 to 10.75

The following prices are per net ton:

Iron Fish Plates.....	\$16.00 to \$16.50
Iron Car Axles.....	20.00 to 20.50
No. 1 Railroad Wrought.....	14.50 to 15.00
No. 2 Railroad Wrought.....	13.50 to 14.00
Railway Springs.....	13.00 to 13.50
Locomotive Tires, smooth.....	13.50 to 14.00
No. 1 Dealers' Forge.....	11.50 to 12.00
Mixed Borings, &c.....	7.00 to 7.50
Machine Shop Turnings.....	9.50 to 10.00
No. 1 Boilers, cut to Sheets and Rings.....	10.00 to 10.50
No. 1 Cast Scrap.....	13.50 to 14.00
Railroad Malleable.....	12.00 to 12.50
Agricultural Malleable.....	10.50 to 11.00
Pipes and Flues.....	10.50 to 11.00
Railroad Sheet Scrap.....	10.50 to 11.00
Railroad Grate Bars.....	12.50 to 12.75

Lead, Spelter, Etc.—Pig Lead is quiet, but there is considerable demand from small consumers at 4.15c. to 4.17½c., East St. Louis. Lead Ore is lower and held at \$26 to \$26.50 per 1000 lb., Joplin basis. Spelter is ruling strong at 5.05c. to 5.10c. for prime Western galvanizing and 5.30c. to 5.40c. for Brass trade stock. The demand from Brass producers would seem to indicate that no stocks of consequence are being carried and that purchases are being made to take care of current orders. The market for Zinc Ore is firm at \$42 to \$43 per ton, Joplin basis, and practically all production is being cleaned up. Tin is ¼c. off; Antimony, ½c. off; Copper, unchanged. The demand is not so active as last week.

The plant and good will of the Acme Metal Company has been sold to the Great Western Smelting & Refining Company of Chicago. The plant is located at Broadway and Branch street. The Great Western Company, it is said, will make extensive improvements in the property.

The Scullin-Gallagher Iron & Steel Company reports having the contract to furnish Cast Steel body bolsters for 500 box cars and 200 stock cars for the San Antonio & Aransas Pass Railroad Company.

Philadelphia.

PHILADELPHIA, PA., December 8, 1908.

The market begins to take on the usual year end appearance. Buying has diminished in nearly all lines and little of importance is expected to develop until after the turn of the year. How rapid the forward movement will be at that time will depend to a considerable extent, no doubt, on the influence the tariff revision hearings have on the trade, and it is expected that a certain amount of hesitancy will be shown until something of a definite nature in that respect becomes available. The volume of business transacted during the week in the various branches of the trade in this territory was hardly as large as that of the previous one, and in but few instances was any increase to be noted. Confidence in a material betterment early next year is general, as there is a large amount of business pending, some of which comes out comparatively freely.

Pig Iron.—The market has been gradually slowing down, and recent transactions have been on a rather small scale. This is not unusual at this season, when melters in many cases defer buying owing to the closing of the year's

business. The large consumers, except some of the Cast Iron Pipe makers, several of whom are still anxious to cover for early 1909 requirements, have taken about all the Iron they want, and are practically out of the market. The bulk of the business done, therefore, has been confined to such buyers who come into the market from month to month for current needs. Sellers have pretty well cleaned up their production, in some cases that for the first quarter of next year being already sold. While a number of furnaces are in shape to go in blast on short notice, producers are not likely to increase production largely until the market takes on a more active appearance. Sales have been confined almost entirely to Foundry grades, but the individual quantities have been small, 500-ton lots being the maximum. Prices for these grades continue firm, as nothing better apparently than \$17.25, delivered, can be done for Standard eastern Pennsylvania No. 2 X Iron, and in many cases sellers are holding firmly at \$17.50, delivered, at which moderate sales have been reported. While there has been some inquiry for second quarter Iron, sellers are not anxious for such business and frequently refuse to quote or name prohibitive prices for deliveries of that character. Virginia Foundry Iron are firmly held, and no sales of consequence have been recently made in this territory. Some sellers are practically out of the market, and refuse to quote on deliveries beyond the next month or two. Southern Irons are quiet, although some fair tonnage has been offered the Cast Iron Pipe foundries on a \$13, Birmingham, basis for No. 2, but the price is not attractive enough to result in business. Several sellers refuse to quote on that basis, even for first quarter deliveries, for which they want 50c. advance. Forge Iron has been rather inactive, but this grade is scarce and prices are being firmly maintained. Somewhat more active conditions are to be noted in the Basic market, and upward of 10,000 tons has been sold for first quarter deliveries at somewhat less than \$17, delivered, although the same sellers now hold firmly at that figure. Some little demand for Low Phosphorus Iron has developed, and while no business of consequence has been closed prices for this grade are firmer. Notwithstanding the fact that buying has been lighter in all grades, prices are decidedly strong, and for forward shipment show an advancing tendency. For delivery in buyers' yards, eastern Pennsylvania and nearby territory, the following range of prices is quoted for shipments extending over the first quarter of next year:

Eastern Pennsylvania, No. 2 X Foundry.....	\$17.25 to \$17.50
Eastern Pennsylvania, No. 2 Plain.....	16.75 to 17.00
Virginia, No. 2 X Foundry.....	17.25 to 17.50
Virginia, No. 2 Plain.....	17.00 to 17.25
Gray Forge.....	15.75 to 16.00
Basic.....	16.75 to 17.00
Low Phosphorus.....	21.50

Ferromanganese.—Several small lots have been before the trade during the week, but no business of importance has developed. Sellers appear to be getting a little closer regarding quotations, which range from \$45 to \$45.50, Baltimore, for spot shipment, with \$46 to \$47 named for deliveries in the first half of next year.

Steel Billets.—Sales are still confined to small lots for fairly prompt shipment. While there has been some inquiry for delivery the coming year, no business of that character has been closed. Quotations show no change. Ordinary Rolling Steel for delivery in this territory commands \$26.20, with Forging Steel \$28.20, subject to the usual extras for high carbons and special sizes.

Plates.—A comparatively fair volume of business has been transacted, which in the aggregate compares favorably with that of the previous week. Orders for a considerable tonnage of Plates from shipbuilders in this vicinity have gone to Western mills, although one for some 6000 tons is still before the trade. Some moderate orders for Plates for Structural work have been booked, but the bulk of the business is of a miscellaneous character. Prices are being firmly maintained and range as follows for delivery in this vicinity:

	Carloads. carload.	Parts carload.
	Cents.	Cents.
Tank, Bridge and Boat Steel.....	1.75	1.80
Flange or Boiler Steel.....	1.85	1.95
Commercial Firebox.....	1.95	2.00
Marine.....	2.15	2.20
Locomotive Firebox Steel.....	2.25	2.30
The above are base prices for ¼-in. and heavier. The following extras apply:		
3-16-in. thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

Structural Material.—Orders have not developed so rapidly recently, although there is a good tonnage of both large and small work pending. The Pencoyd plant of the American Bridge Company is operating at about 60 per cent. of its capacity, and other mills are doing a trifle better, while the Structural department of the Bethlehem Steel Company is running full time. Although immediate busi-

ness is largely of a miscellaneous character, the outlook is considered favorable. Prices for delivery in this territory show no change, 1.75c. to 1.90c. being named, according to specification.

Sheets.—The demand shows a little improvement, particularly in that buyers have contracted for forward requirements to some extent. In this connection, however, sellers have for the most part not been willing to accept such business for deliveries extending beyond the first half of the year. A comparatively good day to day demand for prompt Sheets continues to be noted. The following range of prices is named for mill shipment, a tenth extra being added for small lots: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—A trifle more business is being done, but mills are far from busy. Orders coming out are not large, but makers show greater firmness in quotations, owing to increased cost of raw materials. Prices for Refined Iron Bars range from 1.50c. to 1.55c., delivered in this territory. Steel Bars are unchanged, at 1.55c., delivered, with Re-rolled Bars at 1.50c.

Coke.—The movement in Coke has been rather slow. Makers have been handicapped in production to some extent by the shortage of water at the ovens, and prices show increased firmness. No business of importance has been done during the week, and prices are unchanged. Foundry Coke is quoted at \$2.30 to \$2.60, at oven, with Furnace Coke \$1.85 to \$2.10, at oven. For delivery in this territory, prices range about as follows:

Connellsville Furnace Coke.....	\$3.85 to \$4.10
Foundry Coke.....	4.20 to 4.50
Mountain Furnace Coke.....	3.45 to 3.70
Foundry Coke.....	3.80 to 4.10

Old Material.—The market shows increasing strength. The usual monthly railroad lists are now being bid on by both melters and dealers, and current business is therefore small. Transactions recently have been largely between dealers, although small tonnages of both Heavy Melting Steel and Rolling Mill Scrap have been taken by consumers at advanced prices. Holders of Steel Scrap are holding very firmly, and it looks like higher prices for this grade. For delivery in buyers' yards, eastern Pennsylvania and nearby territory, quotations, while to a large extent nominal, range about as follows:

No. 1 Steel Scrap and Crops.....	\$16.75 to \$17.25
Low Phosphorus.....	18.75 to 19.25
Old Steel Axles.....	21.75 to 22.25
Old Iron Axles.....	23.50 to 24.00
Old Iron Rails.....	21.00 to 21.50
Old Car Wheels.....	16.00 to 17.00
Choice No. 1 R. R. Wrought.....	20.00 to 20.50
Machinery Cast.....	16.00 to 16.50
Railroad Malleable.....	15.75 to 16.25
Wrought Iron Pipe.....	15.25 to 15.75
New Bundled Sheets.....	14.50 to 15.00
No. 1 Forge Fire Scrap.....	13.75 to 14.25
No. 2 Light Iron.....	10.00 to 10.50
Wrought Turnings.....	14.00 to 14.50
Stove Plate.....	13.75 to 14.25
Cast Borings.....	12.50 to 13.00
Grate Bars.....	14.25 to 14.75

The German Iron Market.

BERLIN, November 26, 1908.

The situation that has come about in the German Iron industry during the past few months is a most interesting and complicated one. While the trade reports generally teem with statements that business is in an extremely depressed condition, the statistics of production do not indicate this. In October the make of Pig Iron amounted to 941,580 metric tons. This was about 98,000 tons less than in October, 1907, but it denotes a gain of about 12,000 tons over September. The October shipments of the Steel Syndicate in semifinished material, structural forms and Rails, too, show no indication that the Steel trade is in a state of prostration. Thus the shipment of Steel for purposes of further manufacture reached 142,673 tons, which was the largest movement since last November. The shipments of structural shapes aggregated 110,597 tons, which was about 19,300 tons less than in the corresponding month of last year, but it was about up to the average of the past 12 months. In Steel Rails, &c., the total was 161,374 tons, which is about the average movement for the past half year, but 17,600 tons less than in September, 1907.

Prices Have Suffered.

But when we turn to the question of prices a wholly different picture of existing conditions is found. Here, indeed, is the weak spot in the situation. The relatively satisfactory shipments of semifinished Steel, for example, were only rendered possible by forcing exports at very low prices. The preliminary foreign trade statistics for October show an outgo in this specialty of 54,793 tons, against 18,258 tons last year.

The same thing is still more true in the case of Pig Iron. It is here that prices have been cut most heavily; and this has occurred particularly within the past month, owing to the breakdown of the efforts to reorganize the Duesseldorf Pig Iron Syndicate. This organization, indeed, continues

its existence to the end of the year; but the furnaces belonging to it have been free since October 1 to make contracts for 1909 delivery at their own prices. This has been going on with great activity since that date; and under sharp competition to get orders prices have been cut frightfully in this short period. In the Rhenish-Westphalian District the price of Hematite dropped 10 marks, or from 75 to 65 marks, at one clip, just after the final breakdown of the negotiations for the renewal of the syndicate was announced. By the end of October a further cut to 60 marks was registered, and since then prices ranging several marks lower than that have been mentioned. It is added that the low price now reached is in many cases below the cost of production; and for this reason it is believed that the bottom figure has been touched. In the Luxemburg-Lorraine District the price of ordinary foundry grades has for some time been 50 marks.

Low Prices Stimulate Trade.

At the low price of Hematite mentioned above sales have been occurring in unusual volume, and it is reported that some of the great producers of the Lower Rhine and Westphalia have orders enough to keep their furnaces running to the end of next June. The price-cutting in Pig Iron, curiously enough, has been chiefly carried on most recklessly by the very greatest concerns, like Gelsenkirchen, Krupp, Thyssen, and others. These are all among the most important members of the Steel Syndicate, and it is a highly significant fact that this war of prices should have been raging precisely among them. It only goes to show that the bond of friendship existing among the Syndicate concerns is strictly limited to the fully syndicated products (semifinished and structural shapes, and Steel Rails). Even in Steel products not syndicated these great works have been competing in prices most vigorously, particularly in Bars of all grades, for many months.

The effect of the rapid shrinkage of Pig Iron prices has been not only to shut out English competition, but it is even said that German Hematite is now being offered in England itself. This has occurred chiefly within a fortnight; but even the trade statistics for October show what a striking change had already taken place by that month. The imports of Pig Iron dropped to 19,577 tons, against 48,193 tons in October, 1907; and exports rose to 22,884 tons, as compared with 18,735 a year ago.

Pessimistic Trade Reports.

The general character of reports from the trade has been quite unsatisfactory, and even pessimistic. Prices of the A Group of Steel products already mentioned, indeed, are strictly maintained by the Syndicate, except in the case of export goods; but in the B Group (i. e., all other Steel products than semifinished material, Structural Shapes and Steel Rails) prices are very unsteady. The great mixed mills are bidding sharply for orders in Plates and Bars, the prices of which have reached such a low level as has not been known for years. The big Syndicate works are pressing outside makers of these specialties so sharply that the latter are mostly no longer able to keep in the race; but even those big works are selling these products at a loss, and it is claimed that their next year's balance sheets will show the bad effects of this policy. Under the circumstances it is said that unattached rollers of Plates and Bars can do nothing better for themselves than to shut down. Their situation is all the harder owing to the high prices of Coal, whereas the big producers in the Syndicate have their own Coal mines, and their fuel only stands to them at the cost of production.

From the Luxemburg-Lorraine District it is reported that nearly all of the big Steel mills there are shutting down on Mondays, and not running at their full capacity on other days. They have managed to avoid dismissing their employees by putting the latter at other work. Much new construction work has been undertaken in this dull period. In a number of cases furnaces have been blown out, and are being replaced with much larger ones. In the Rhenish-Westphalian District work of this kind is going on; and there, too, the steel mills are not running to their full capacity.

The association controlling Steel Castings met a fortnight ago, and reduced prices by 10 per cent. At the same time, it was reported that business in this specialty had not grown worse, but that the demand was a bit brisker. The reduction was evidently voted to take account of the price cutting that had been going on, and with the hope of stopping it.

Wire Rods Better Than Other Lines.

One section of the Steel trade seems to be doing a much better business than most others, namely, the Wire Rod business. It is mentioned that the mills have as much work as they can do, and that shipments are called for at a brisk pace. Foreign markets are sending in good orders, but at low prices. In band iron, too, business appears to be somewhat better, but there is considerable price cutting.

On the whole, it may be said that the Iron industry is looking forward to next year with hopes of an improvement in business. It is believed that the building trade will revive next spring, under the influence of the present extraordinary

ease of money rates, together with the fact that there are many unemployed masons and carpenters now ready to work at considerably reduced wages. More activity in building must bring much work to the rolling mills, as well as to some branches of the hardware trade.

The market also expects that the German Iron trade will soon begin to feel the effect of the improving situation in the United States. People on the stock exchanges are watching the news from America with great eagerness; and the weekly summary of *The Iron Age*, an abstract of which is regularly cabled over here, is watched for as a valuable pointer for operators in German Iron shares. The extraordinary rise of the common stock of the United States Steel Corporation has also made a big impression on the German exchanges; and home Iron shares are consequently tending pretty strongly upward at a time when the business situation leaves so much to be desired.

Just now the trade is considerably excited over a bill which has been introduced into the Reichstag for taxing electricity at 5 per cent. of the cost of production, but not in excess of 0.4 pfennig per kilowatt hour. This tax will bear very heavily upon the great Iron and Steel mills, most of which have put in electricity for almost every application of power in their establishments; and they necessarily consume electricity on an enormous scale. One Steel manufacturer has recently given an example of how the proposed tax will effect his company, which will soon complete its great electrical equipment, and will then produce and consume not less than 35,000,000 kw.-hr. annually. The tax on this and on incandescent lamps and electrodes, says this manufacturer, will amount to nearly \$13,000 a year for his company, which is considerably more than 1 per cent. on its capital stock. In this case the company will regret that it threw out its steam plant and adopted electricity. The Iron trade will make a strenuous effort to defeat this absurd tax, and will find strong support for its efforts in the Reichstag. It is probable that the bill will fail when its gross absurdity has been fully shown up.

New York.

NEW YORK, December 9, 1908.

Pig Iron.—In the Foundry trade the feature is that there is a continued urgency on the part of melters to crowd deliveries on old contracts. There have been some good sales of the different grades, including Basic and Malleable, and the market is steady. We quote \$17.50 to \$17.75 for No. 1 Northern Foundry, \$17 to \$17.50 for No. 2 Foundry, and \$16.25 to \$16.50 for No. 2 Plain. Alabama Irons are quoted \$17.50 to \$17.75 for No. 1 Foundry, and \$17.25 to \$17.50 for No. 2 Foundry.

Steel Rails.—The Pennsylvania Railroad order, which will be for 160,000 is expected to be given out in the next 10 days. The Steel Corporation, as heretofore, will probably receive something less than 60 per cent. of it, while most of the balance will be divided between the Cambria and Pennsylvania Steel companies. The delay over this business has been over the adjustment of a part of the specifications relating to rejections, due to failure under drop test of Rail rolled from the top bloom of the ingot. The railroad has now made a counter proposition which involves the acceptance of other Rails from the same ingot, at \$28 a ton, but their separate marking so that they may be properly placed in service. The New Haven Road is expected to contract for 1908 Rails in the next few weeks, and will probably take Open Hearth Rails exclusively, with unusually low phosphorus and very high carbon. In the past week the Pittsburgh Rail mill has entered 3100 tons from the Fort Clinton Short Line, and 3500 tons from scattering sources.

Structural Material.—No great amount of the business recently pending was placed in the past week. The largest bridge order was for 3300 tons, for the Copper River & Northwestern Railroad in Alaska, taken by the American Bridge Company. The same company has the contract for a Fels & Co. Building in Philadelphia—400 tons—and for a Spreckels Building, 300 tons, and the Columbia Theatre, 600 tons, in San Francisco. In New York J. B. & J. M. Cornell will furnish 1000 tons of Steel for a brewery extension, and the Eastern Steel Company has the contract for an apartment house in Gramercy Park, 600 tons. The Equitable Building project, much talked of some time ago, is taking on more life recently, and there is a prospect that a definite move will be made soon. The plans discussed call for 50,000 tons of Steel. Several roads are receiving bids on bridge work, several hundred tons each in the case of the B. & O. and C. & O. and the Erie and New Haven have plans for a number of small bridges. The Milliken Bros. receivers took orders for about 3200 tons of fabricated Steel in November, as against what are considered normal bookings of 4000 to 5000 tons. We quote, tidewater delivery, shipments from mill, as follows: Beams, Channels, Angles and Zees, 1.76c.; Tees, 1.81c. On Beams, 18 to 24 in., and Angles, over 6 in., the extra is 0.10c. Structural Material, cut to lengths, is sold in small lots at 2½c.

Ferroalloys.—The Ferromanganese market is strong, at \$45, seaboard, which is firmly maintained, and inquiries for next year's delivery continue. Much lower prices are prevailing for 50 per cent. Ferrosilicon, and some sales have been made at \$64, Pittsburgh, and it is possible that even lower quotations have been named. These, however, are for special lots, and perhaps large quantities could not be had at the above figures.

Bars.—The approach of the inventory period is undoubtedly affecting purchases, the volume of business now being quite light. Prices are steady, with Bar Iron quoted at 1.51c. to 1.56c., and Steel Bars at 1.56c., tidewater.

Plates.—Transactions are confined to small lots, and prices on Standard Sized Plates are firmly held as follows: Sheared Plates, 1.76c. to 1.86c.; Flange Plates, 1.86c. to 1.96c.; Marine Plates, 2.16c. to 2.26c.; Firebox Plates, 2.65c. to 3.50c., according to specifications.

Cast Iron Pipe.—Conditions in this branch of trade are distinctly better. Purchases for early delivery consist of carload lots only, but a great deal of figuring is proceeding on considerable quantities for spring delivery. The gas companies are especially prominent in this respect, as they are unlike municipalities operating water works, being unhampered by waiting for authority to proceed with extensions of mains. The contracts already closed for spring delivery undoubtedly aggregate a good tonnage, while negotiations are proceeding for much more. Manufacturers are confident of good business in 1909. The contracts for spring delivery are generally made on the basis of \$1 per ton advance over present prices. Carload lots of 6-in. for immediate shipment are selling at \$24 per net ton at tidewater.

Old Material.—The market shows a pronounced upward tendency on all classes of Scrap except Foundry stock. Steel Scrap is probably strongest, as inquiries are out for quite large quantities and dealers are quite frequently overbidding consumers in taking material offered by holders. An effort is being made by consumers of Steel Scrap to hold prices down, but as the supply is not plentiful it is a question whether the dealers will not come out victors in the contest. Some buying is noted by rolling mills, but the demand is not large. Foundries are buying quite sparingly. Relaying Rails are more plentiful, and with heavier offerings prices are easier. Quotations are as follows, New York and vicinity, per gross ton:

Old Girder and T Rails for melting	.....	\$14.00 to \$14.50
Heavy Melting Steel Scrap	.....	14.00 to 14.50
Old Steel Rails, rerolling lengths	.....	16.00 to 16.50
Relaying Rails	.....	22.50 to 23.00
Old Iron Rails	.....	19.00 to 19.50
Standard Hammered Iron Car Axles	.....	21.50 to 22.00
Old Steel Car Axles	.....	18.50 to 19.00
No. 1 Railroad Wrought	.....	17.50 to 18.00
Iron Track Scrap	.....	15.00 to 15.50
No. 1 Yard Wrought, long	.....	16.50 to 17.00
No. 1 Yard Wrought, short	.....	15.00 to 15.50
Light Iron	.....	8.50 to 9.00
Cast Borings	.....	10.00 to 10.50
Wrought Turnings	.....	11.00 to 11.50
Wrought Pipe	.....	13.00 to 13.50
Old Car Wheels	.....	15.00 to 15.50
No. 1 Heavy Cast, broken up	.....	14.50 to 15.00
Stove Plate	.....	12.50 to 13.00
Locomotive Grate Bars	.....	12.50 to 13.00
Malleable Cast	.....	13.50 to 14.00

Metal Market.

NEW YORK, December 9, 1908.

Pig Tin.—Tin prices continue to sag, due, in part, to the unfavorable statistical position caused by an increase in supplies and a decrease in consumption, and, more especially, at this time, to manipulation. One of the leading operators in London gave out the tip that the market was due for a £10 break. As usual on such gratuitous information everybody believed Tin was a purchase, but strange to say the market did drop. On Monday there was sharp hammering, which carried the price in New York down over ½c. per pound. This has been partially recovered, but not all, and the following is the daily range of quotations:

		Cents.
December 2	.....	29.40 to 29.45
December 3	.....	29.50 to 29.55
December 4	.....	29.50 to 29.55
December 7	.....	28.87½
December 8	.....	28.80 to 28.85
December 9	.....	29.10

One reason for the present stagnation of the market is the supply of Tin in consumers' hands, they having bought fully 1000 to 1500 tons in November for future delivery. Supplies are ample for all needs, arrivals since the first of the month being 1339 tons, and there are afloat for American ports 2100 tons. The London market is slightly higher than yesterday, closing at £132 for spot, and £134 for futures. The spot market is £2 under that of a week ago, while the market for futures is practically unchanged from last week.

Copper.—Trade is exceedingly quiet, and the market is ragged. No sales of any consequence have been made and quotations are largely nominal. Electrolytic can be had at 14.12½c., net cash, and it is reported that even lower quo-

tations have been made by second hands. It is a fact that lower prices have been named for European delivery, but this is no new thing in the Copper trade. Lake Copper is firmly held by producers at 14.50c., and it is doubtful if there are any large outside lots obtainable under this figure. Evidences are increasing that the prices of Electrolytic and Lake are breaking away from one another. The Lake producers are in a comfortable position, having sold most of their product for December and January. Not only this but the conditions of the trades into which Lake goes are such that there is a firm belief, well founded, that business will again develop in January. This grade is used in the Brass and Sheet Copper trades, which are now running at least 90 per cent. of normal. Should the market for Electrolytic, however, break far away from that of Lake, so that there would be a difference of 1c. per pound, it is easily conceivable that Electrolytic would be largely substituted for Lake Copper. The exports so far this month amount to 5715 tons. The London market is about £1 10s. lower than last week, closing to-day at £62 12s. 6d. for spot and £63 12s. 6d. for futures.

Pig Lead.—Dullness continues to rule in this market, the leading interest offering shipment Lead in 50 ton lots at the unchanged price of 4.30c., New York. Independent producers are selling as low as 4.27½c., New York. A bid of 4.25c. has been refused by an outside producer, despite assertions to the contrary. In St. Louis, the price is about 4.15c.

Spelter.—The Spelter market is not as strong as last week, and 5.15c., New York, is apparently the ruling quotation. In St. Louis the market is quoted at 5c. to 5.05c.

Aluminum.—Considerable unevenness in price between importers and the domestic producer is in evidence. The prices of the leading interest are 24c. for No. 1 Ingots, 32c. for Rods and Wire and 34c. for Sheets.

Antimony.—Prices are without change from last week, Hallett's being held at 8.12½c. to 8.25c., Cookson's at 8.37½c. to 8.50c. and outside brands at 8c.

Tin Plates.—Orders are in a little larger volume, and the mills are more actively engaged than for some weeks. Prices are unchanged, at \$3.70, Pittsburgh, and \$3.89, New York, for 100 lb. IC Coke Plates. In Swansea, Welsh Plates are 1½d. lower, at 12s. 1½d.

Old Metals.—The market is very dull, and prices, although unchanged from last week, are largely nominal. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy and Crucible.....	13.50 to 13.75
Copper, Heavy and Wire.....	13.25 to 13.50
Copper, Light and Bottoms.....	12.00 to 12.25
Brass, Heavy.....	9.50 to 9.75
Brass, Light.....	7.50 to 7.75
Heavy Machine Composition.....	12.50 to 13.00
Clean Brass Turnings.....	8.50 to 9.00
Composition Turnings.....	10.50 to 11.00
Lead, Heavy.....	4.25
Lead, Ten.....	4.00
Zinc Scrap.....	3.75

Iron and Industrial Stocks.

NEW YORK, December 9, 1908.

Merely a trading market has been experienced on the Stock Exchange the past week. Fluctuations have not been wide, as no special influences have developed to move prices in either direction. The range of prices on active industrial stocks from Thursday of last week to Tuesday of this week has been as follows: United States Steel common 53¾ to 55½, preferred 112¼ to 113; Bethlehem Steel common 22 to 22½, preferred 52; Car & Foundry common 46 to 46½, preferred 108 to 108½; Locomotive common 55½ to 56½, preferred 109½ to 109¾; Steel Foundries 39; Cambria Steel 37½ to 39½; Colorado Fuel 37½ to 42; Crucible Steel common 8 to 8¼, preferred 53 to 54½; Pressed Steel common 38¼ to 39, preferred 98¾; Railway Spring common 42¼ to 43¼, preferred 101 to 102½; Republic common 26½ to 26¾, preferred 86 to 87; Sloss-Sheffield common 78 to 79½, preferred 110 to 110¼; Cast Iron Pipe common 28¾ to 30, preferred 74¼ to 75¼; Can common 9¼ to 9½, preferred 75¼ to 76¼. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 56, preferred 113, bonds 102¼; Car & Foundry common 46½, preferred 109; Locomotive common 56, preferred 109½; Colorado Fuel 40¾; Pressed Steel common 39½, preferred 98¾; Railway Spring common 42¾; Republic common 27, preferred 86½; Sloss-Sheffield common 79; Cast Iron Pipe common 29¾, preferred 77; Can common 9¼, preferred 76.

The financial report of the American Steel Foundries and subsidiary companies for the quarter ending October 31, 1908, shows a falling off in net earnings of \$645,985, as compared with the corresponding period a year ago. There was a deficit after total deductions of \$112,500. Following are the figures:

	1908.	Changes.
Net earnings.....	\$11,548	Dec. \$645,985
Other income.....	36,057	Inc. 24,526
Total income.....	\$47,605	Dec. \$621,459
Deductions:		
Interest on bonds.....	\$81,398	Inc. \$23,323
Sinking funds on bonds.....	59,616	Inc. 33,366
Depreciation.....	19,181	Dec. 36,569
Total deductions.....	\$160,195	Inc. \$20,120
Deficit.....	112,590	Inc. 641,579

The foregoing net earnings are after the deduction of manufacturing, selling, administrative and head and district office expenses and before deducting depreciation.

The detailed income account of the American Car & Foundry Company for the quarter ended October 31 shows the following, as compared with the same period a year ago:

	1908.	1907.
August 1 to October 31:		
Net earnings.....	\$694,664	\$2,775,643
Preferred dividend.....	525,000	525,000
Balance.....	\$169,664	\$2,250,643
Common dividend.....	150,000	300,000
Surplus.....	\$19,664	\$1,950,643
Total surplus.....	\$22,395,953	\$23,271,251

Dividends.—The American Can Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable January 2.

The American Smelting & Refining Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable January 2.

The Ingersoll-Rand Company has declared the regular semiannual dividend of 3 per cent. on the preferred stock, payable January 2.

The Sloss-Sheffield Steel & Iron Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable January 1.

The Canadian Westinghouse Company has declared the regular quarterly dividend of 1½ per cent., payable January 1.

The Otis Elevator Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable January 15.

The Mingo Plant Started.—Two of the blast furnaces of the Mingo plant of the United States Steel Corporation have been blown in this week, and the steel works are to be started next week on billets and steel bars. The plant will run on the basis of between 50 and 60 per cent. of its full capacity.

The La Belle Iron Works, Steubenville, Ohio, will place a contract soon for the building of a 250 or 300 ton metal mixer. The steel building for the mixer house will be erected by the McClintic-Marshall Construction Company, Pittsburgh. The ore boat for which a contract was recently awarded to the American Shipbuilding Company by the Pitt Iron Mining Company, a subsidiary of the La Belle Iron Works, is to be named the La Belle. All the plates for this boat will be rolled in the La Belle mills except the widest sizes, which will be furnished by the Jones & Laughlin Steel Company. This boat will be in service next season, and will hold 10,000 to 12,000 tons of ore.

The Scott Iron & Steel Company, recently formed in Pittsburgh, has taken over the plant formerly operated by the Carnegie Tube Company, at Carnegie, Pa., and will begin the manufacture of steel castings and later on will make horseshoes. The company is incorporated under the laws of Pennsylvania with a capitalization of \$725,000. George P. Steele is president and J. C. Stauffer, of Carnegie, is secretary and treasurer.

This week the sales agents of the La Belle Iron Works, Steubenville, Ohio, are holding their annual gathering. They met in Steubenville on Tuesday and in Pittsburgh on Wednesday evening and all day Thursday. The company entertained them with a banquet and a theatre party.

The Fawcus Machine Company, Pittsburgh, manufacturer of cut gears, pinions, &c., has installed in its plant a new motor driven machine of special design, containing some distinct and new features, for use in cutting gears up to and over 20 ft. in diameter and to 42-in. face.

Canadian Industrial News.

TORONTO, December 7, 1908.—The furnace of the Deseronto Iron Company, at Deseronto, Ont., is being rebuilt and is expected to be ready for operation by next April. The company's former stack was destroyed by lightning in September.

Negotiations for the construction of steel rolling mills at Cobourg, Ont., are in a forward state. A company has been formed to build and operate the works. Joint meetings of the Town Council and Board of Trade have been held to consider the company's proposals, which seem in a fair way of being agreed upon. The town is asked to grant exemption from municipal taxes and to limit the assessment for school taxes to \$10,000; to give the use of certain streets for the purposes of an electric railroad line to be operated in connection with the plant. The electric line would run to the harbor and be used as a coal carrier inward and a conveyor of finished product outward. There are to be four buildings erected, the dimensions of the largest being 80 x 350 ft. If the negotiations end in agreement a by-law to validate the contract will be submitted to the rate payers in January.

A project for putting up large smelting works in the Cobalt District is being considered by Toronto and Montreal capitalists interested in that mining field. The output of the mines is now so large that the treatment of the ore begins to press upon the plants in existence.

On the first of December the Quebec Bridge Company went out of business, and the work of building the bridge as an integral part of the National Transcontinental Railway will be taken over by the Dominion Government. Construction is to be begun as soon as the plans have been finished by the board of engineering experts to which their preparation has been intrusted. In the new superstructure much heavier frame work is to be used than that called for by the design of the old.

C. P. Sandberg is to leave London shortly for Sydney, Nova Scotia, where he will inspect the rails which the Dominion Iron & Steel Company has contracted to make for New South Wales. The rails for this order, 16,000 tons of 80-lb. are to be rolled some time this month. Assisting Mr. Sandberg will be E. Lee, who went to Sydney as inspecting expert about five years ago. Mr. Sandberg's company is understood to have placed a large order for fish plates with the Nova Scotia Steel & Coal Company, the work to be done before the end of the year. Mr. Sandberg inspected the first order of rails rolled at the Sydney steel plant, 25,000 tons, for the Intercolonial Railway.

A meeting of the Atikokan Iron Company was held at Port Arthur a few days ago. The president, Hugh Sutherland, stated in a newspaper interview that the plant will be opened as soon as the price of pig iron advances sufficiently to warrant the recommencement of operations. His visit was to clear off the liabilities of the company. He does not expect that the furnace will be lighted before spring.

The Dain Mfg. Company, Ottumwa, Iowa, has entered into an arrangement with the municipality of Welland to establish a Canadian branch of its works in that town. It will manufacture stackers, loaders, presses, rakes, mowers and possibly other agricultural implements at its Canadian plant. For the purpose a Canadian company, capital \$200,000, has been organized, the provisional directors being Joseph Dain, Paul Arbenz, F. M. Hunter, all of Ottumwa; B. J. McCormick and Col. L. C. Raymond, K. C., of Welland. For some years the company has been meeting the demands of its Canadian trade by assembling parts at Preston.

The Angus shops of the Canadian Pacific Railway Company, at Montreal, are now turning out 20 freight cars a day, and it is expected that this rate of operation will be maintained for six months at least. The works have locomotive building to do as well, \$500,000 having been appropriated for this purpose by the company. Further, \$2,000,000 is to be expended on passenger car equipment before the end of June.

After finishing its first car order for the Grand Trunk Pacific, the Canada Car Company has now entered upon another large one.

C. A. C. J.

The American Brass Company.

A recent issue of the Boston News Bureau gives some interesting information relative to the operations of the American Brass Company, whose headquarters are at Waterbury, Conn. Charles F. Brooker is president of this great company, which is reputed to be the largest individual consumer of copper in the world, its requirements in some years totaling above 100,000,000 lb. of copper. For three years the net earnings of the subsidiary properties of the American Brass Company have been as follows, the 1907 profits naturally reflecting the disturbed business conditions of the second half of the year:

Year ended December 31:	Net earnings.
1907.....	\$1,303,249
1906.....	2,265,798
1905.....	1,335,976

The balance sheet of the American Brass Company as of January 1, 1908 and 1907, is presented hereunder:

Assets.		
	1908.	1907.
Cash	\$60,664	\$47,503
Due from subsidiary companies.....	2,533,756	2,807,750
Accounts receivable.....	18,174	13,121
Birmingham Brass investment.....	171,414	168,940
Capital stock subsidiary companies....	12,500,080	10,000,000
Totals.....	\$15,284,088	\$13,037,314
Liabilities.		
Capital stock.....	\$15,000,000	\$10,000,000
Debentures	*225,000	850,000
Accrued interest.....	9,833	32,173
Paid on subscription new stock.....	.....	2,148,240
Surplus	49,255	6,901
Totals.....	\$15,284,088	\$13,037,314

* Paid off since January 1, 1908.

The American Brass Company was formed early in 1903, and it owns the entire capital stock of the Ansonia Brass & Copper Company, the Benedict & Burnham Mfg. Company, the Coe Brass Mfg. Company and the Waterbury Brass Company. It also owns, through subsidiaries, the Ansonia Land & Water Power Company, Birmingham Brass Company, Chicago Brass Company and Waterbury Brass Goods Corporation. The combined trial balance of the subsidiary properties in the American Brass Company as of January 1, 1908 and 1907, is as follows:

Assets.		
	1908.	1907.
Real estate, machinery and tools.....	\$8,169,909	\$7,855,776
Permanent improvements spent.....	783,239	*314,133
Cash	857,422	1,056,173
Accounts and bills receivable.....	3,812,335	5,552,807
Stocks owned in other companies.....	2,303,876	2,091,618
Patents	1,000	1,000
Merchandise, raw, wrought and in process	4,582,467	4,228,005
Totals.....	\$20,510,248	\$21,009,512
Liabilities.		
Capital stock.....	\$5,550,000	\$5,110,000
Current accounts and bills payable....	945,633	1,227,067
Loans from parent company.....	2,533,756	2,807,750
Surplus	10,632,702	10,824,459
Reserve for contingencies.....	848,157	1,130,236
Totals.....	\$20,510,248	\$21,009,512

* After deducting \$400,000 charged off each year for depreciation.

There has been marked improvement in the brass industry since election, and many of the wire factories and rolling mills in the Naugatuck Valley of Connecticut are operating on longer time than for the past 12 or 15 months.

At the meeting of the German Stahlwerks Verband, held at the close of last month, the books were opened for the sale of billets for the first quarter of 1909 at the present prices and terms. The sales of beams and shapes for the first half of 1909 were authorized at a reduction of 5 marks per metric ton. Besides this authority was given to deliver to buyers a minimum quantity of 200,000 tons of shapes at a further reduction of 5 marks for winter delivery. The details of the terms for the sale of shapes will not be determined until a decision has been reached concerning the re-establishment of the Dealers' Beam Association.

Seattle Railroad and Trade Notes.

SEATTLE, WASH., November 30, 1908.—E. C. Hawkins, chief engineer of the Copper River Railway, being built by the Guggenheim interests from Cordova to the interior of Alaska, has just returned from the north with the announcement that 55 miles of "as good road as any transcontinental line ever constructed" have been completed to the head of Abercrombie Rapids, on the Copper River. In addition to Mr. Hawkins, M. J. Heney, the contractor, and other officials have returned. Mr. Heney says the line thus far has the heaviest steel rails and a roadbed that would do credit to any system. No trains will be run over the line this winter, but a service is to begin in March. Steamers will operate on the river above the rapids, and in addition to giving regular service will handle the materials for the 25-mile railroad which will be built from the Chitina to the Bonanza mine.

Work on the Pacific Coast extension of the Chicago, Milwaukee & St. Paul Railroad continues to be rushed. The remaining gaps for the rails represent a total of only about 35 miles in the State of Washington, from the Idaho line to the Sound, and outside of this State, about 135 miles of steel must be laid before the eastern connections are complete. The entire line will be ready for freight traffic by the first of next July. The Union Pacific (Oregon & Washington Railroad) is rapidly closing up its franchise and right of way affairs for the extension from Portland to Puget Sound. Eastern contractors are figuring on the tunnel, considerably more than half a mile long, to be built under Tacoma.

The report of the Northern Pacific, filed at Olympia, the State capital, shows that that road had advanced to the Spokane Portland & Seattle (the new line recently completed down the north bank of the Columbia River from Pasco to Vancouver, Wash.), \$26,514,893 up to June 30, last. The completion of the extension down the Columbia was the occasion for the recent visit to the Coast of James J. Hill, his son, Louis Hill, president of the Great Northern; Howard Elliott, president of the Northern Pacific, and Mr. Harris, president of the Burlington. In his speech at the banquet given by the Seattle Chamber of Commerce and Alaska-Yukon-Pacific Exposition trustees, Mr. Hill declared that no more transcontinental roads would be built north of the Platt River, although the existing systems would construct many branches to develop the country and the maximum traffic.

A few days ago, the North Coast Railway, which has a right-of-way across this State and is supposed to have affiliations with some transcontinental line, not yet revealed, let the contract for grading 20 miles of right-of-way near Kennewick. Eighteen miles, from Grand View to Granger, is now ready for rails, and the construction work is approaching North Yakima.

The improvements made during the past year by the Great Northern within the State of Washington are commended by the State Railroad Commission, a representative of which reports as follows: "On my first inspection of the track of the Great Northern from the Idaho line to Seattle, about a year and a half ago, this track was found in a defective and dangerous condition, owing to bad ties. Wrecks were of frequent occurrence. After the Milan wreck the company immediately put on a large force of men, 800 being employed on 300 miles of railroad. Many thousand new ties were placed, miles and miles of heavy steel laid, and many ballast trains have been engaged in hauling gravel, until now comparison with other lines in the State is inviting." Among other features, the Great Northern has substituted 3232 tons of steel for 3700 lineal feet of timber bridges in the State. The work of electrifying the Cascade tunnel, costing \$1,250,000, is under way.

Farmers of Walla Walla County have decided to take over the stock and the right-of-way of the Columbia & Walla Walla Traction Company, with right-of-way from Dayton, Prescott, Waitsburg and Walla Walla to the Columbia River, 72 miles in all, and build the road in time to handle the wheat crop next fall. Stock is being placed with the business interests as well as with the wheat growers.

The Seattle Car Mfg. Company, recently reorganized, increasing its paid up capital by \$100,000 and issuing \$100,000 10-year bonds, drawings 6 per cent. interest. Added to the original paid up capital of \$150,000, this makes \$350,000 invested in the business. The company has a modern, first-class plant, fully equipped, on the shores of Lake Washington at Renton, 10 miles from Seattle. The company recently shipped 28 cars to the Sun Ning Railroad Company in China.

The postponed meeting of the foremen of the iron-working plants at Portland, Ore., took place there November 25.

The Seattle Electric Company, operating all the street railroads in this city but one, will add 100 new cars to its equipment before the first of next May, in anticipation of heavy traffic during the exposition.

The Moran Company of this city expects to build two of the new torpedo boat destroyers for the Government, representing about \$500,000 in cost. The company will soon lay the keel for a 2000-ton oil burning steamer, but withholds, for the present, the name of the purchaser.

Report comes from the Skagit Valley that engineers are working on a plan for developing the power of that stream, and that 300,000 hp. could be attained with proper harnessing of the forces.

W. T. P.

Lake Ore Shipments, 25,430,543 Tons.

Returns from the nine Lake Superior docks show that the shipments of iron ore by water in the season of 1908 were 25,430,543 tons, an estimate being made of two cargoes which were still to be loaded at Escanaba, Mich., when the figures were wired from that port on Tuesday, December 8. The shipments after November 1 were somewhat larger than had been counted on, reaching 3,700,471 tons. In the following table the shipments from the various ports in 1908 are given, with corresponding figures for the three preceding years:

Iron Ore Shipments from Upper Lake Ports.—Gross Tons.				
	1908.	1907.	1906.	1905.
Escanaba	3,354,952	5,761,988	5,851,095	5,307,938
Marquette	1,487,487	3,013,826	2,791,033	2,977,828
Ashland	2,513,670	3,437,672	3,388,111	3,485,344
Two Harbors	5,702,237	8,188,906	8,180,128	7,779,850
Superior	3,564,030	7,440,386	6,083,057	5,118,385
Duluth	8,808,168	13,445,977	11,220,218	8,807,559
Total by lake	25,430,544	41,288,755	37,513,642	33,476,904
Total by rail	956,315	1,008,597	876,552	
Total shipments	42,245,070	42,245,070	38,522,239	34,353,456

The all-rail shipments for the year, which will not be accurately known until after January 1, may reach 500,000 tons, but in this exceptional year may have fallen off more, in proportion, than the water shipments. They include ore shipped from the Mesaba range to the Duluth furnace and shipments from various ranges to the charcoal furnaces of Michigan and Wisconsin, as well as the ore mined on the Baraboo range and at Iron Ridge, Wis., and shipped by rail to South Chicago. The total shipments for the Lake Superior region in 1908 may thus prove to be between 25,900,000 and 26,000,000 tons, or something over 60 per cent. of the total for 1907. The United States Steel Corporation's water shipments this year were 14,252,911 tons, against 22,553,642 tons in 1907. Its percentage of the movement by lake this year is 56, as against 53 per cent. last year. The all-rail figures will change these percentages somewhat. The Mesaba range has increased its proportion of the shipments this year as compared with 1907, its percentage of the water shipments being 68, while last year it sent out 66.5 per cent. The Mesaba total shipped in vessels this year was 17,232,891 tons, and that of the Vermillion range, 841,544 tons.

The Canton-Hankow Railroad, Canton, China, which is having six standard gauge mogul freight locomotives built by the American Locomotive Company, has engaged Gulick, Henderson & Co., Pittsburgh, to do the inspecting for it. This firm makes a specialty of inspecting equipment and solid steel wheels for traction roads.

Trade Publications.

Perforated Metal.—Manhattan Perforated Metal Company, 237 Centre street, New York. Circular. Illustrates the principal styles of perforated metal made by the company, showing a wide variety in patterns and designs, and listing the various equipment the metal can be applied to.

Multiple Luminous Arc Lamps.—General Electric Company, Schenectady, N. Y. Bulletin 4621. Luminous arc lamps for multiple circuits are illustrated and described here, and special attention is paid to the form 2 lamp, which is intended primarily for use in foundries and machine shops, &c., where a large unit is desired. The lamp is made for 110 and 220 volt direct current circuits.

Metal Lath.—Northwestern Expanded Metal Company, 920-950 Old Colony Building, Chicago, Ill. Booklet. Prices of the company's metal lath are given, together with directions for specifying its use in buildings and for applying it. Some interesting data regarding finish for walls, together with tables for making mortar mixtures, are included.

Railroad Inspection Cars.—Light Inspection Car Company, Hagerstown, Ind. Booklet. Shows several types of light railroad inspection cars, from a single seat bicycle frame pedal propelled machine to a gasoline car operated by a 3-hp. motor.

Surface Condensers.—Wheeler Condenser & Engineering Company, Carteret, N. J. Bulletin No. 102. The Wheeler rectangular surface condenser is shown connected with steam turbines, and a treatise on the economy of condensing is given, together with descriptions of a number of types of the company's condensers. Several installations are illustrated and descriptions for installing condensers are given.

Antifriction Metals.—A. Allan & Son, 486 Greenwich street, New York. Bulletin No. 2, 6 x 9 in., 32 pages. This is the second of a series of bulletins which are to form a descriptive catalogue of the Allan metal, and is devoted chiefly to its application to heavy power apparatus.

General Railroad and Mill Supplies.—Consolidated Supply Company, 34 Dearborn street, Chicago, Ill. Catalogue No. 15, 6½ x 9½ in., 24 pages. This is a manufacturers agents' catalogue, listing a number of specialties sold by the company, including some compressed air equipment, track appliances, special drills, riveting and chipping hammers, electric grinders, &c. Attention is called to the company's general line, which includes mining supplies and contractors' equipment.

Gas Producers.—The Gas Machinery Company, Cleveland, Ohio. Booklet 261. This is in bulletin form arranged for loose leaf binder, and shows the Wile gas producer for nonbituminous fuels. The advantages of producer gas for power or fuel are discussed, and the machine is illustrated by showing several installations with the aid of sectional views.

Reinforced Concrete Buildings.—Turner Construction Company, 11 Broadway, New York. Bulletin No. 5. One of a series of bulletins describing plants erected by this company. Shows the building of the Keuffel & Esser Company at Hoboken, N. J. Views of the exterior and interior of the completed structure are given, together with a general plan. Attention is called to the present price of material and diagrams show the fluctuations during the last six years.

Economizers.—B. F. Sturtevant Company, Hyde Park, Mass. Circular. Shows parts of the Sturtevant economizers and calls attention to the metal to metal joints used in this device, which requires no gaskets. The joint is formed by a tapered cylinder entering a tapered hole, which places the machined surfaces in close contact.

Metal Lath, Expanded Metal, Concrete Reinforcing and Steel Furniture.—The General Fire Proofing Company, Youngstown, Ohio. Booklet. A condensed catalogue of the company's product, including herringbone expanded steel lath and other types of expanded metal lath. Concrete reinforcing material and several examples of metal furniture, file cabinets and lockers are illustrated.

Solenoid Brakes.—Whiting Foundry Equipment Company, Harvey, Ill. Catalogue No. 48 for loose leaf binder. Shows the company's direct current electric solenoid brake and briefly describes its parts. These brakes are used on all of the company's traveling cranes and they can also be purchased separately.

Ice Harvesting Machinery.—A. L. Schultz & Son, Chicago, Ill. Special Catalogue No. 10, 6 x 9 in.; 15 pages. Illustrates a general line of ice harvesting machinery, including various types of ice harvesters, plows, saws, &c.

Roller Bearings.—Standard Roller Bearing Company, Philadelphia, Pa. Circular. Describes briefly the company's manufacturing equipment and mentions that its line includes anti-friction bearings in the shape of steel, brass and bronze balls, thrust bearings and roller bearings for all mechanical purposes.

Remote Control Switches.—Pettingell-Andrews Company, Boston, Mass. Bulletin entitled "Economy, Convenience, Safety." Describes in detail the company's P M remote controller switch. Diagrams illustrate different types and their connections and they are described in full.

Gas; Gasoline and Distillate Engines.—The Reeves Engineering Company, Mt. Vernon, Ohio. Booklet. Announces the merging of the firm of Reeves Brothers, Columbus, Ohio, with the Reeves Engineering Company, Mt. Vernon, Ohio, and describes the company's line of engines, which are made principally in the vertical type, of four-cycle, in both single and multiple cylinders. The construction of the engines which are built in sizes from 17 to 18 hp. is briefly described, and lists of other sizes given of single, double or triple cylinder vertical type from 2 to 125 hp.

Chain Hoists and Trolleys, Malleable Iron Castings, &c.—Chisholm & Moore Mfg. Company, Cleveland, Ohio. Catalogue, 6 x 9 in.; 56 pages. High speed chain hoists and particularly the Cyclone hoist are shown and their parts. Differential pulley blocks and hoists, trolleys and hoists, and hand power traveling cranes are also illustrated, and some space is given to door hangers and malleable iron castings.

Crushers, Magnetic Separators, &c.—Pennsylvania Crusher Company, Philadelphia, Pa. Catalogue No. 11, 6 x 9 in.; 42 pages. Shows hammer crushers and rock crushers, both portable and stationary, in a number of types. The standard hammer crusher made by the company is for six or eight rows of hammers and can be adjusted to particularly fine grinding. Sectional views of the machine are given, in addition to illustrations of the assembled equipment. Coal cleaners, magnetic separators and rotary crushers are shown with appropriate descriptive matter.

Vacuum Cleaning Systems.—Vacuum Engineering Company, 114-118 Liberty street, New York. Catalogue, 6¼ x 9¼ in.; 30 pages. A new type of the vacuum producing apparatus, consisting of a suction, valveless, reciprocating pump, which may be steam, belt or motor driven, is described. With it the dust is drawn into a saturating chamber, in which a very small flow of water is maintained; the dust and the mixture is carried through the pump and discharged to the sewer. The machine is made in horizontal and vertical types, and plants specially designed for residences are shown. A number of large buildings where the system is in use are illustrated.

Beveled Rail Joints.—Duncan Bond, Exchange Building, Denver, Colo. Catalogue A. Shows the Jones beveled rail joint with the aid of line drawings. A number of views of the joint in use on the tracks of the Denver City Tramway Company, Denver, Colo., are given, including a picture of a joint after four years' service which shows it to be in excellent condition.

Foundry Equipment.—S. Obermayer Company, Cleveland, Ohio. General Catalogue No. 40, 6 x 9 in.; 370 pages, and booklet. The catalogue comprises an inventory of everything needed in foundries, in addition to a line of materials for special foundry purposes. It is completely indexed and contains an interesting history of the growth of the company, with views of its main branch houses. Some space is given to describing the work of the company's experimental department and its foundry equipment experts. Illustrations range from the more important lines of foundry equipment down to numerous styles of foundry brushes, and a specially complete line of foundry sundries is listed. Line drawings illustrating installations of brass furnace plants and other ideal layouts are shown. Information for foundrymen, including formulas and recipes, and suggestions for lining a cupola are included. Of particular interest is a number of illustrations of modern molding machines and views of foundry crane installations of the latest type. The booklet is entitled "Money Making Hints for the Core Room," and advertises the company's line of cores and explains proper methods of core making.

Traveling Cranes, Hoisting Engines, Contractors' Equipment, &c.—Victor R. Browning & Co., Cleveland, Ohio. Bulletins Nos. 2, 3, 4 and 5. No. 2 shows overhead electric traveling cranes and describes the general design of this company's line. No. 3 shows a number of types of the Armington hoist, including the type F Armington power hoist and drive. Line drawings illustrating the standard hoist are given. No. 4 illustrates the company's standard double cylinder and double drum hoisting engine by a view of a complete machine and sectional views. No. 5 describes the standard double drum hoisting engine.

Steel Boxes, Pails, Barrels, &c.—The Geauga Mfg. Company, Painesville, Ohio. Booklet. Describes steel boxes for various uses in shops and cites their advantages over wooden boxes. Attention is called to the fact that a wooden box cannot be cleaned when soaked with oil, is not as durable and is inflammable. Steel hand barrows, steel tote pails with perforated bottoms for use when it is desired to clean articles by dipping, steel shop kegs, lathe pans, annealing pans and barrel trucks are illustrated.

Condensers.—Mesta Machine Company, Pittsburgh, Pa. Booklet. The Helander barometric condenser, which is particularly adapted for large plants, is shown. It is built entirely of cast iron, and among its advantages are that it contains no rivet holes to become leaky nor movable parts, and requires no internal adjustments for varying conditions of operation. A cross section of the condenser vessel is shown, together with some standard types. The economy of condensation is treated briefly and a list of users is given.

The Machinery Trade.

NEW YORK, December 9, 1908.

In view of the gradual increase in business of the past two months, trade last week was unsatisfactory with many of the machinery houses. In October a betterment was noticeable and November closed with still a large number of orders booked, but thus far this month neither orders nor inquiries have been quite so plentiful. The slight lull in the demand is attributed by many to the close of the year, which is usually a quiet period as it is the time of stock taking and it is the general desire to have purchases charged in next year's account. While the temporary falling off is regretted, merchants feel sanguine as to the opening of the new year. General conditions appear to be sound, the inquiries received are of a more substantial character, though still covering only a few tools each, and many manufacturers are preparing to add to their equipment after the first of the year. Salesmen who have recently come in from the road all report bright prospects. Very little has as yet been heard from the railroads and larger industrial corporations, the business in view being nearly all from the smaller establishments. It is believed, however, that the railroads must soon come into the market for round lots of tools and houses are keeping in close touch with the large systems, particularly the Delaware, Lackawanna & Western Railroad, which is expected to issue its list of requirements for its new machine shop at Scranton, Pa., at an early date, and the New York Central lines. In this connection some interesting facts became known this week which show why one of the greatest railroads made so few purchases the past year. When the depression came this road took an inventory and found that it had \$14,000,000 worth of material stored at different points. From this supply the road has been able to fill the greater part of its requirements and still has a considerable amount of material on hand.

From all accounts the New York, New Haven & Hartford Railroad is going ahead with its plans to electrify a six-line track from 129th street, New York, to New Rochelle, and it is reported that the Bradley-Gaffney-Steers Company, 1 Madison avenue, New York, has been given the general contract. The expenditures for the improvement, it is said, will amount to fully \$30,000,000, and will entail the construction of tunnels under the East River to Astoria and the erection of a large passenger station on the block bounded by Fourth and Lexington avenues at Thirty-second and Thirty-third streets to be connected with the Pennsylvania tracks. Considerable subway work will be included in the contract, and in addition to the power equipment necessary to the electrification and the general electrical equipment the project will be one of the largest carried out in this vicinity during the next few years in the way of railroad construction. It may be some time before the matter will come before the trade in the way of machinery requirements, but when it does it can be seen that with the equipment necessary to carry out the tunneling and subway end of the work the general trade will be materially benefited. In this connection it is interesting to learn that the New York Central Railroad is arranging to extend its electrical zone by putting electric trains on its Harlem Division from Wakefield to White Plains, a distance of about 12 miles. It will give the company a through third-rail system from the Grand Central Station to White Plains. The company has started excavating for a new power house at Tuckahoe, N. Y., to supply electricity for the line. The structure will be of brick and concrete and will be 60 x 200 ft.

It is reported in the trade that a list covering an extensive line of machine tools will shortly be prepared by the Delaware, Lackawanna & Western Railroad for the large shops which are in course of construction at Scranton, Pa. As has been stated, the foundry has been provided for, but the machine shop equipment has not been purchased as yet. This shop, which will shortly be put under roof, is about 346 x 582 ft., and it can be seen that the list will necessarily be a large one.

The Washington, Alexandria & Mt. Vernon Railroad, Washington, D. C., which leased the Falls Church Railroad, is erecting a 600-kw. substation at Lacey, Va., where in the near future it will erect car shops and a car barn. The company recently installed a 1000-kw. turbine in its power plant to furnish power for the Falls Church division.

In its application to the Public Service Commission for permission to issue \$30,000,000 of new bonds the Erie Railroad summarizes the cost of the improvements contemplated, the money to pay for which is to be secured by the sale of the bonds. The large improvements to be provided for include terminals, repair shops, additional tracks, &c.

The Champion Shoe Machinery Company, St. Louis, Mo., will not require a large amount of new machinery for its new plant, as it will move its present equipment into the new building as soon as it is completed. The company will, however, be in the market for an engine, lathes, milling machines, &c. The new plant which the company is erecting will be 170 x 182 ft., two stories.

The Onondago Litholite Company, Syracuse, N. Y., which, as noted in these columns last week, is open for bids on a 7½-ton electric traveling crane, 25-ft. span; sand molding machines, patternmaking machines, woodworking machines, general foundry equipment, belt conveying machinery, &c., has sold its plant on the Erie Canal, at Northwest and Tracy streets, and will build a complete new plant on another site. A main building, 50 x 250 ft.; pattern shop and power plant, 50 x 75 ft., two stories, of steel and concrete, will be erected.

Considerable machinery has been purchased from time to time by the contractors who are building the Erie Barge Canal, several contracts for important parts of which were awarded a week or two ago. The Kinser Construction Company, Chicago, Ill., with a branch office at Fort Edward, N. Y., which was awarded contract No. 46, for the construction of the canal from Fox Ridge to Galena, about 9 miles, will use \$75,000 worth of hydraulic dredging machinery in completing this contract. It will do the work for \$1,212,833.

The opposition to the building of the Fourth avenue subway in Brooklyn has been withdrawn, and it is probable that contracts will be let within the next few months for the construction of the first two sections. Bids were taken on the work some time ago, and it is thought that contracts can be let without getting additional bids.

Business Changes.

The National Acme Mfg. Company, Cleveland, Ohio, whose Eastern offices, of which L. M. Waite is manager, were recently removed to 77 White street, has leased the basement of that building for a storage warehouse and show-rooms and will carry a full line of cap screws, set screws, nuts and mill supplies. The company previously carried a good sized stock, but its new storage facilities will admit the laying in of sufficient supplies to meet all demands.

The Spooner-Matthewson Company, 90 West street, New York, has assumed the Eastern sales agency for the Hadsel non-tilting concrete batch mixer, which is made by the Keystone Engineering Company, Wilkes-Barre, Pa.

Henry Pels & Co., New York, manufacturers of punching and shearing machines, have moved their offices to the West Street Building, 90 West street.

Chicago Machinery Market.

CHICAGO, ILL., December 8, 1908.

Reports from the leading machinery houses covering transactions of the past week indicate a fair degree of improvement in actual sales, as well as brighter prospects ahead. Inquiries are not only more numerous, but it is noticed that they are beginning to come from the more important manufacturing concerns, and are covering requirements of greater magnitude. Speaking of recent business closed, a prominent machinery house refers to it as quite satisfactory, and says that included in it are several lots of machine tools of considerable size. The fact that tool orders are being placed for additional equipment in plants which are yet running light, bespeaks the existence of a hopeful sentiment respecting future developments. There is, in truth, very little doubt expressed on any hand as to the progressive betterment of conditions, and the consensus of opinion in the machinery trade, seems to be that the new year will mark the beginning of a better movement, which will steadily lead onward to a full normal volume of business. It is conceded, however, that the acceleration will depend in a large measure upon the expansion of railroad activities. If these interests come into the market without prolonged delay for what they will actually need to carry forward their necessary operations in a vigorous manner, the stimulus of such buying will greatly quicken the demand for tools, not only for railroad shops, but for those of others engaged in the manufacture of railroad supplies of one kind or another. Usually the closing month of the year is devoted more to the closing up and balancing of accounts than to the negotiating of new commitments, and while a good deal of preliminary figuring may be done on pending requirements between now and the first of January, the actual closures for this period are hardly expected to assume unusual proportions.

The demand for electrical machinery is gradually extending. The growing use of independent motor drives for machine tools and other machinery, is reflected in increased sales of such equipment. The constantly widening field for the application of electricity as a motive power, that is being opened up by the reduced cost of generating current through improvements made in generating machinery, and

the economic distribution of energy, is bound to result in still greater expansion in all branches of this industry.

The Apperson Brothers Automobile Company, Kokomo, Ind., a copartnership, has been incorporated with a paid-up capital of \$400,000, without change of name. In order to take care of its increased business, greater factory space became necessary, and to provide it, the company has purchased an adjacent site upon which it will erect a three story addition to its present plant. Foundations will be put in at once for the new building, and work on the superstructure will be commenced early in the spring and pushed to completion in time to have the new quarters ready for occupancy by May 1. This improvement will increase the present available floor space about 50 per cent. For the equipment of the building, the purchase of a number of machine tools will probably be made. The company is officered as follows: Elmer Apperson, president; Edgar Apperson, vice-president; A. G. Seiberling, secretary and treasurer.

The Enamel Concrete Company, Des Moines, Iowa, is under the necessity of materially increasing the capacity of its plant, and expects in the near future to purchase a considerable amount of new tools and machinery of a character required for the manufacture of its product.

The Vesper Safety Clevis & Malleable Iron Company, Vesper, Wis., is about to begin the erection of a new factory plant, which will include two main buildings of brick, one 60 x 100 ft., and the other 60 x 200 ft., with an engine room 35 x 45 ft. It is expected that the plant will be completed and its machinery equipment installed about May 1. It will be supplied with tools and machinery for the manufacture of punches, shears, clevises, &c.

The Bakersfield Auto Supply Company, Bakersfield, Cal., is arranging to build a two-story brick garage 20 x 122 ft., for the accommodation of a stock of automobile supplies. In addition to this building, there will be erected in the rear a machine shop 115 x 122 ft., which will be supplied with a complete equipment of machinery and tools for the repair of automobiles, including a complete vulcanizing plant.

The Bertschy Motor Company, Council Bluffs, Iowa, recently incorporated with a capital stock of \$50,000, of which \$20,000 is already paid in, will engage in general machine work and the manufacture of several specialties under patents controlled by the company. A department will also be established for the construction of new and the rebuilding and repair of old automobiles. In addition to passenger machines, a specialty will be made of motor trucks for farm use, designed for hauling gang plows in the field and drawing grain to market. The company also has under consideration the building of an automobile fire engine for fire department service. Ground has been broken at Sixth street and Eleventh avenue, near the Union Pacific freight house, for a plant to accommodate this industry, which will be equipped with modern machinery adapted to the work described. The installation will include some special tools for automobile work. The officers of the company are: T. R. Children, president; A. J. P. Bertschy, vice-president and general manager; Geo. S. Wright, secretary; Ernest E. Hart, treasurer.

With a view to supplying additional power to meet the growing demands of service, the Home Electric Light & Power Company, Greeley, Col., has in contemplation the expenditure of about \$35,000 for the enlargement of its capacity. Plans now under construction include the installation of two gas engine units of 125 hp. each, one 125 kw. three phase, 900 rev. per min. generator, together with extension of lines and other facilities for handling its increased volume of business.

Arrangements are being made by A. C. Burmeister, Redwood Falls, Minn., for the construction of a hydro-electric plant, for which two 100 kw. generators and water wheels will be required. The cost of this installation, including line material, is estimated at between \$20,000 to \$30,000.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 8, 1908.

Conditions satisfactory to the shop superintendent prevail generally at the machine tool manufacturing establishments in this field, for he is gradually adding men and increasing the productive efficiency of his plant, but there is still something to be desired viewed from the office standpoint. Practically all the larger establishments belonging strictly to the machine tool division were interviewed since our last letter, and this condition is indicated. There has been a falling off in inquiries, although on the other hand some concerns have had their first stock order for many months. Machine tool builders in this field regard this feature (the awakening of the dealers) an important item in the matter of trade reconstruction. Scattering sales of tools, one or two at a time, have been a feature of the last two or three months, these going to the Government, to

municipalities for their toolrooms, and to automobile manufacturing concerns, but dealers, as a rule, have remained silent. Now that the selling agents have become inspired with confidence the feeling is that a trade revival is imminent, and the approximate period for its introduction is fixed at about the middle of January. There is no increase in demand from foreign countries. Dealers in second-hand machinery have had but a nominal business since election.

Locally, the manufacturers of ice machines and medium sized electric power equipment have had a fair business since the first of December. A local manufacturing establishment which is soon to be housed in a splendid plant in the new colony at Oakley has in process of making five large ice machines, orders for the most part received since election, and the electric power department of the company is gradually improving time and forces.

The American Tool Works Company, which maintains four special departments—lathes, planers, shapers and radial drills—has been gradually improving its working time and forces until 40 and 50 hr. per week represent the present working capacity, and men have been added from time to time until the establishment is working now fully three-fifths of the large force on its payrolls early in 1907.

A report that a large local establishment had reduced wages 20 per cent. was found to be incorrect. As a rule the expert men have been kept on throughout the months of depression and at their old salaries, which has been greatly appreciated by these men. Some cuts were made during the spring and summer in the woodworking machinery plants, manufactories of miscellaneous machinery and some foundries, but as a rule the tool makers stood by their expert help nobly.

The Steptoe Shaper Company started on full time immediately after election and has added men since. An order from a dealer calls for two 14-in. single gear, two 16-in. single and back gear and two 20-in. back gear for early shipment. This company recently shipped two shapers to Australia. The East seems to have had the first trade awakening according to this company. An order recently received from a dealer in San Francisco was followed within a couple of weeks by a duplicate order, which suggests that the West is beginning to experience the beneficial results of the better times also.

A feature of the current correspondence from dealers throughout the country seems to be the general holding up of orders for equipment on which bids have been asked until after the first of the year. An explanation of this is that shops generally want to present the best possible balance sheet of the year's work and are busy with the details of inventories, &c.

Tool making and machinery manufacturing generally are having great vogue in this locality just now through the splendid prospects opening up for the adherents of co-operative education, as is shown by the aid given the University of Cincinnati idea for co-operative study and work in the shops. This will be strongly brought out at the annual dinner of the Cincinnati Metal Trades Association at the Business Mens' Club on Thursday evening. The idea has spread to the Young Men's Christian Association and that institution now has a large class in sheet metal cutting. Eleven young men constituted the original class, which is growing rapidly. The course of instruction covers cutting of cornice and blowpipe systems, including T and Y joints and elbows.

The Bass Foundry & Machine Company, Ft. Wayne, Ind., is working on a duplicate set of machines recently shipped for use on Panama Canal work which went down in the wreck of the steamer Finance several days ago. The company has shipped to Ft. Worth, Texas, a 500-hp. Corliss engine for operating the plant of the Texas Rolling Mill Company.

On or about January 1 the Union Foundry & Machine Company, recently incorporated, will take over the business of the Union Foundry at Mansfield, Ohio. Most of the stock is held in Pittsburgh. The incorporators are N. O. Fleming, W. B. Martin, Harry Deyarman, C. W. Deyarman and L. H. Beam.

It is reported through local pig iron sales agencies that the Hoosier drill branch of the American Seeding Machine Company at Richmond, Ind., now has the largest pay roll in its history, over 700 men.

The Bucyrus Steel Castings Company, Bucyrus, Ohio, is rapidly getting in shape to resume normal conditions at its plant and conditions are announced as improving.

Reports from the American Steel & Iron Company at Norwalk, Ohio, indicate that conditions are gradually improving in every department under the efficient general direction of General Manager H. E. Frazier, formerly of Cincinnati, and the special influence of President Charles R. Brown.

The Cincinnati Car Mfg. Company has enjoyed a moderate run of orders, the last calling for \$250,000 worth of cars for Washington, D. C., deliveries on which are being made from time to time.

Cleveland Machinery Market.

CLEVELAND, OHIO, December 8, 1908.

Business in the local machine tool market the past week as a whole has been quite satisfactory. The improvement which started soon after election has kept up and an optimistic feeling prevails both among the machinery manufacturers and the dealers. Salesmen for local machinery houses who travel through Ohio and some of the adjoining territory report a fair volume of orders from almost all kinds of manufacturing industries. While sales are mostly small, orders being for from one to three or four tools, these orders have been sufficient in number to make a fair volume of business. Industrial activity continues to show improvement and many of the smaller manufacturing plants are adding somewhat to their equipment. The orders that are being placed now are in many cases for tools, the purchase of which had been under consideration for several months, but had been delayed until general conditions had improved. The Wheeling & Lake Erie Railroad made its purchase during the week of the iron working tools for which it has had an inquiry out for several weeks. The list includes a miscellaneous lot of 15 or 20, mostly large tools, all amounting to about \$30,000. Other railroads are expected to come into the market soon for some new tools for shop requirements in this territory.

Inquiries are coming in quite plentiful, so that the outlook for further improvement in the machine tool market is quite encouraging. Among the new inquiries is one from a steel plant for several tools. During the past year very few new industrial plants have been started in this territory, but now that general conditions have improved the outlook for a fair demand for machine tool equipment for new concerns that are planning the establishment of plants is considerable better. Although the automobile manufacturers are about through buying new machine tool equipment for the coming season, some business is still coming from this source. Orders for heavy handling machinery are not plentiful as yet, but inquiries are considerable better. An improvement is noted in the demand for gas engines.

The jobbing foundry situation, while as yet not satisfactory, shows a slight improvement from week to week.

The local manufacturing situation is growing better slowly. Few plants are as yet running at their normal capacity, but nearly all report an improvement in orders and are able to slowly increase their working forces. Some of the manufacturers of automobile parts, of which there are a number in this city, report that they have about all the work on hand that they can do.

The Cleveland Crane & Engineering Company, Wickliffe, Ohio, is finding considerable improvement in business, shipments for some time past having been steadily improving. Among recent shipments are two 10-ton three-motor 40-ft. span alternating current cranes to the Puget Sound Navy Yard; one 10-ton three-motor 40-ft. span crane, New Orleans Navy Yard; one 75-ft. 15-ton crane, Dallas, Texas; two 20-ton three-motor cranes, Isthmian Canal Commission for the Panama power houses; one 15-ton three-motor 50-ft. span crane, Erie Foundry Company, Erie, Pa. Among the cranes now under construction are three 10-ton two-trolley five-motor alternating current cranes for the Scully Steel & Iron Company, Chicago, Ill.; 10 three-motor 48-ft. span high speed cranes and two 10-ton three-motor special trolleys, Isthmian Canal Commission; one 10-ton three-motor crane, Chicago Railways Company, and one 20-ton 50-ft. span crane for export to Cuba. Inquiries have improved and the present outlook is bright for an increased and profitable business for 1909.

The Wellman-Seaver-Morgan Company, Cleveland, reports a continued improvement in the outlook and a greater volume of inquiries for heavy machinery. Inquiries from Western mines for hoists and other equipment have become more plentiful. The past week the company received an order from the El Oro Mining & Railway Company of Mexico for an electric geared mine hoist with two 84 x 48 in. drums, a duplicate of one that it delivered to the same company about a month ago.

The Electric Welding Products Company, Cleveland, finds its capacity entirely too small for its increasing business and has had plans prepared for a large addition to its plant which will double its present capacity. It is expected that the addition will be built during the coming spring. The company now has a large amount of work on hand, largely from automobile makers for parts, and it was found necessary to operate the plant night and day for several weeks to catch up on orders. The plant is now being run until 9 p.m. with its full force of workmen.

The plant of the Royal Motor Company, Cleveland, which has been operated by a receiver during the past year, has been turned over to a new company, known as the Royal Tourist Car Company, which will continue to manufacture the Royal automobiles. The officers of the new company are George J. Dunham, Boston, president; H. S. Calhoun,

Cleveland, vice-president and treasurer, and Clifford W. Fuller, Cleveland, secretary.

The A. D. Milner Seating Company, Canal Dover, Ohio, has been organized, with a capitalization of \$100,000, to manufacture opera chairs, school desks and a post office assorting rack. The company expects to build a plant, including a foundry, at Canal Dover. The officers are A. R. Milner of Canal Dover, president; George W. Williams, vice-president; Thomas Rodgers, treasurer; C. O. Waltz of Alliance, secretary. The officers and W. E. Seibert of New Philadelphia and James Rees of Canal Dover are the directors.

The Farmobile Company, Columbus, Ohio, has been incorporated, with a capitalization of \$200,000, to manufacture rope driven farm traction machinery. The company will occupy a large factory building on Dublin avenue that was erected a year ago for the Ohio Mfg. Company of Upper Sandusky, which afterward decided not to move to Columbus. The incorporators are C. J. Eastman, James Stewart, M. W. Kouns, W. J. Miller and D. W. Jones.

The Board of Public Service, Cleveland, will receive bids until December 17 for two 60-hp. boilers with stokers for the heating plant at the city Zoo at Brookside Park.

George E. Neale, machinery dealer, has moved his office from 249 Arcade to 710 New England Building, Cleveland.

Philadelphia Machinery Market.

PHILADELPHIA, PA., December 8, 1908.

The undertone of the local machinery market is decidedly optimistic, notwithstanding the fact that little change is to be noted in the volume of business transacted from week to week. Under the usual conditions trade is hardly expected to increase materially the next month or six weeks, although it is confidently expected that early next year buying will become more active, leading gradually toward the normal. In the week past no sales of importance have been reported, manufacturers and dealers both reporting about the average volume of business, made up principally of single tool propositions and confined closely to the medium and smaller class of tools. The demand for special machinery is somewhat smaller, the rush of trade of this character which developed shortly after election having by this time been pretty well cleaned up. Builders of the heavier machine tools report a somewhat better demand, a number of good inquiries are being figured on, which if only one-half developed into orders would soon put some plants on a normal basis, but developments are slow—a condition not unusual in this class of trade.

As far as any material increase in the output of machine tool builders in this vicinity is concerned, little of importance is reported. The large majority still continue to operate on a restricted basis, in many cases not exceeding 50 per cent. of their normal capacity, and which is not likely to be increased greatly until stocks on hand have been considerably diminished. In some of the industrial lines more activity is to be noted which should have a favorable influence on the trade. There is a noted betterment in the shipbuilding trade, several of the shipyards having booked some fair orders. There is a better demand for locomotives, and the local manufacturer has booked further orders, but will require a larger increase to enable the plant to be operated on any materially larger scale. The outlook, however, is said to be much more encouraging, and more active conditions are expected after the turn of the year. More business of a municipal character will likely develop early in 1909. Considerable dock work is expected, and it now looks as if the project to tunnel under the Delaware River, a proposition which has been under consideration for several years, might develop into a reality. The railroads show no increased interest in machine tools, although some equipment orders have been placed, but the amount of business derived from this source has been exceedingly small.

There is practically no change to be noted in the foreign demand for machine tools. Very little business is before the trade and orders are much scattered.

A fair volume of trade is reported in second-hand machinery. Transactions are of a day to day character, and are confined to single tools for both wood and metal working purposes. There has been a moderate demand for second-hand engines and boilers, particularly medium horsepower. In new power equipment several quite satisfactory propositions are under consideration, and there is a moderate amount of business of a smaller character before the trade.

The foundry trade continues on about an even basis. Moderate railroad business in the way of cars and locomotives has helped the steel casting trade to some extent, but plants are still far from busy. Some few Gray Iron foundries report a slight betterment, but on the whole the situation shows little change.

The Ensminger Lumber Company, Harrisburg, Pa., will receive prospective plans with estimated cost for the erection of a planing mill, 68 x 200 ft., for sash, frame and stair work. Boilers and engine rooms with equipment will be required, as well as exhaust steam dry rooms to accommodate

200,000 ft. of lumber. The proposed buildings are to be brick or concrete with structural iron roof.

Frederick C. Momeyer, secretary of the Board of Directors of the Poor, Penn Building, Erie, Pa., will receive bids until December 10 for furnishing and installing two steam engines and piping, two electro-generators and switchboards; also materials and labor for wiring the buildings and grounds of the Erie County Almshouse.

Councils of Pine Grove, Schuylkill County, Pa., have under consideration the installation of a municipal lighting plant.

An ordinance has been passed by councils of this city appropriating \$1,500,000 for the use of the Department of Wharves, Docks and Ferries. Specifications for a large amount of general work, which have been prepared by the department, will shortly be released for bids, but contracts will not be made until the necessary funds for the work are available, which is expected to be early next year.

The Espen Lucas Machine Works booked a good number of orders during November, but somewhat less active conditions are to be noted so far this month. A fair number of stock tools were moved, particularly cold saw cutting off machines and boring machines. This company's plant is still operating under unchanged conditions, but an improvement is looked for early next year.

Considerable interest is being shown in the proposed building of tunnels under the Delaware River to connect this city and Camden, N. J. Ordinances are now being prepared for introduction in councils of both cities, which will include both tunnels and an elevated railroad system. Surveys are now being made, and those back of the enterprise announce that the matter will now be pushed to a conclusion. This proposition has been agitated for a number of years, but heretofore has not developed beyond that of the formation of the Delaware Tunnel Railroad Company in Pennsylvania and the Camden Tunnel Railroad Company in Camden, which succeed the original company that obtained a number of rights in connection with the proposed undertaking.

The Link-Belt Company reports a further slight increase in orders, but not yet sufficient to make any marked increase in output. The outlook is somewhat more cheerful, the estimating department figuring on a fairly large amount of work. Orders recently booked include car unloading machinery for export to Cuba; a gravity discharge elevator, apron feeder and car haul for a West Virginia coal company; bucket elevator and chain chip conveyor for shipment to Newfoundland; phosphate rock conveyors for Southern parties, and a number of elevators, freight conveyors, apron, belt and screw conveyors, &c., for coal handling and conveyors for clinkers for various concerns in this State.

New England Machinery Market.

BOSTON, MASS., December 8, 1908.

The experience of the machine tool dealers in November was a varied one. Several of them did slightly less business than in October, while with others there was a small increase in sales. But business for the month was much better than it was in September, the volume of orders having probably more than doubled. December starts out better than November, and dealers look for a very good month considering that it is the closing period of the year. It is not expected, however, that large buyers will enter the market for some little time, at any rate not before the New Year. They are not making active inquiries indicating immediate business, and their preliminary investigations with a view to adding to their equipment were completed some time since. Of course there are exceptions to this; some very good orders are looked for soon from large concerns. But the bulk of the business which will come with a return of normal business conditions is not ready for placing. The machine tool builders report the receipt of some orders, but there is no great improvement over the last two months. The maximum of working hours and forces has been reached for the time being. Not many skilled mechanics are now out of employment, many of those who had been idle having been hired by the shops. When a further impetus of business is felt there will be greater difficulty in securing the right kind of help.

General manufacturing continues to improve. A good instance of this is the abrasive wheel industry, which has felt a very decided betterment that seems to accelerate as the weeks pass by. The industrial situation taken as a whole outside of machinery lines is constantly getting nearer to normal conditions.

The machine tool interests of New England are not a unit in the matter of tariff revision, as it affects the industry. The action of the Committee of Twelve of the National Machine Tool Builders' Association in advocating the establishment of a maximum and minimum rate, retaining the present duty of 45 per cent. as the maximum and establishing 30 per cent. as the minimum, is unanimously believed to be a step in the right direction, but some of the manufacturers, notably those building higher priced tools, think that the decrease will not be sufficient. However, it is agreed that

the tariff is required to protect the American industry from some of the cheaper makes of foreign tools, which if admitted duty free might become formidable competitors of the manufacturers of similar lines here. There is no disposition to interfere with the recommendation of the briefs already submitted to the Ways and Means Committee, unless some way could be devised of a sliding scale that would make the tariff higher on the cheaper machines than on the more expensive makes, which is believed to be impracticable.

The tool steel dealers report that the month of November showed little gain in the volume of new business, but that thus far December has developed a better condition. Few large orders are being booked, but the number of smaller purchases has increased, and the outlook appears to be more favorable.

The Fitchburg Machine Works, Fitchburg, Mass., have been operating on a 59-hr. schedule since September 1, with about three-quarter force, manufacturing exclusively the low swing lathe, for which there has been an active demand.

The City Council of Norwich, Conn., has voted to dispose of a tract of land at Central Wharf, to be used as a site for the plant of the John T. Young Boiler Company. It is understood that the company plans to erect new buildings, including a main structure, 60 x 200 ft., and foundry, 60 x 75 ft., both of concrete. The city of Norwich charged the company only a nominal sum for this land, the purpose being to induce the location of the business in that city, where it had its inception, but from which it moved to Torrington, Conn.

Another great engineering undertaking is planned in connection with the rapid transit facilities of the city of Boston. It is proposed to build a second tunnel under Boston harbor, from East Boston to Post Office square, an enterprise as formidable as was the present East Boston tunnel. The Boston & Eastern Electric Railroad Company has the encouragement of the Railroad Commission in the matter, as evidenced at a recent hearing, and has filed the necessary petition to the Legislature asking permission to undertake the work. The tunnel will give an entrance for the company's cars to the heart of the city.

Announcement is made that the Amoskeag Corporation, Manchester, N. H., which operates the largest cotton mills in the country, is to make very large additions to its plant, increasing its gingham mills 25 per cent. While details of the new buildings are not available, it is given out that they will provide for the employment of 3500 additional hands, which means new construction of large importance. The mills will be located on the west side of the Merrimac River. The large textile mills are substantial customers in the machinery market when they build on a large scale; and are very important factors in the supply business. The Totokett Mfg. Company, Norwich, Conn., is planning to spend \$100,000 in improvements to its mills, and the Warren Mfg. Company, Warren, R. I., another textile concern, is preparing plans for a new mill building to be used as a drawing-in room.

The United States Envelope Company has let the contract for its new factory at Springfield, Mass., which will consist of a five-story building, 100 x 265 ft., with an ell 65 x 80 ft.

The Lozier bicycle manufacturing plant at Thompsonville, Conn., will cease to exist as a machine shop, buildings and equipment having been sold by the Pope Mfg. Company to the Hartford Carpet Corporation.

Government Purchases.

WASHINGTON, D. C., December 8, 1908.

Bids will be received until December 26 at the office of the engineer of the United States Army, New Orleans, La., for machinery and engine for the shop at Burrwood, La.

The following bids were opened November 30, Circular No. 478, for machinery for the Isthmian Canal Commission:

Class 1.—Three Scotch marine boilers—Blidder 4. Atlantic Equipment Company, New York, \$8775; 18. Casey-Hedges Company, Chattanooga, Tenn., \$7899; 24. Connelly Boiler Company, Cleveland, Ohio, \$13,140; 28. P. Delany Company, Newburgh, N. Y., \$8700; 49. Harlan & Hollingsworth Company, Wilmington, Del., \$6343; 61. Kingsford Foundry & Machine Works, Oswego, N. Y., \$7425; 63. Lake Erie Boiler Works, Buffalo, N. Y., \$7140; 69. Manning, Maxwell & Moore, New York, \$7677; 70. Maryland Steel Company, Sparrow's Point, Md., \$8175; 74. I. P. Morris Company, Philadelphia, Pa., \$7670; 77. National Electrical Supply Company, Washington, D. C., \$7359.30 and \$6984.30; 79. Newport News Ship Building & Dry Dock Company, Newport News, Va., \$8100; 81. New York Ship Building Company, Camden, N. J., \$7465; 89. Pusey & Jones Company, Wilmington, Del., \$8400; 105. Springfield Boiler & Mfg. Company, Springfield, Ill., \$8526; 115. Vermilye & Power, New York, \$7140; 128. Marine Boiler Works Company, Toledo, Ohio, \$7326.

Class 2.—Three Scotch marine boilers—Blidder 4. Atlantic Equipment Company, New York, \$11,805; 24. Connelly Boiler Company, Cleveland, Ohio, \$16,200; 28. P. Delany Company, Newburgh, N. Y., \$11,610 and \$11,450; 40. G. & W. Mfg. Company, New York, \$9891; 49. Harlan & Hollingsworth Company, Wilmington, Del., \$9688; 61. Kingsford Foundry & Machine Works, Oswego, N. Y., \$11,490; 63. Lake Erie Boiler Works, Buffalo, N. Y., \$9675; 69. Manning, Maxwell & Moore, New York, \$11,451; 70. Maryland Steel Company, Sparrow's Point,

Md., \$10.125; 74, I. P. Morris Company, Philadelphia, Pa., \$10.450; 77, National Electrical Supply Company, Washington, D. C., \$10.198.50 and \$9601.50; 79, Newport News Ship Building & Dry Dock Company, Newport News, Va., \$11.310; 81, New York Ship Building Company, Camden, N. J., \$9985; 89, Pusey & Jones Company, Wilmington, Del., \$10.800; 105, Springfield Boiler & Mfg. Company, Springfield, Ill., \$10.560; 115, Vermilye & Power, New York, \$9975; 128, Marine Boiler Works Company, Toledo, Ohio, \$9678.

Class 5.—Two air cooled electric drills—Bidder 20, Chicago Pneumatic Tool Company, New York, \$90; 21, Cincinnati Electrical Tool Company, Cincinnati, Ohio, \$107.96; 43, General Electric Company, Schenectady, N. Y., \$69, accepted; 54, Hissey-Wolf Machine Company, Cincinnati, Ohio, \$130; 101, James K. Shaw, New York, \$96.80; 111, United States Electric Tool Company, Cincinnati, Ohio, \$90 and \$117.

Class 6.—One wood boring machine—Bidder 20, Chicago Pneumatic Tool Company, New York, \$50, accepted; 58, Ingersoll-Rand Company, New York, \$72; 125, Independent Pneumatic Tool Company, Chicago, Ill., \$50.

The following bids were opened December 1 for machinery for the navy yards:

Class 11.—One multiple screw machine—Bidder 184, National Acme Mfg. Company, Cleveland, Ohio, \$2875.50.

Class 12.—One grinding and shaping machine—Bidder 223, William Sellers Company, Philadelphia, Pa., \$1000; 250, Tabor Mfg. Company, Philadelphia, Pa., \$1013.75.

Class 21.—Two superheaters—Bidder 201, Power Specialty Company, New York, \$2408.

Class 31.—One back geared crank pillar shaper—Bidder 86, Fairbanks Company, New York, \$525 and \$398; 96, Frevert Machinery Company, New York, \$564; 99, Garvin Machine Company, New York, \$520; 121, Hendey Machine Company, Torrington, Conn., \$395; 166, Manning, Maxwell & Moore, New York, \$475; 188, Niles-Bement-Pond Company, New York, \$490; 209, Queen City Machine Tool Company, Cincinnati, Ohio, \$500.

Class 32.—One single head back geared traverse shaper—Bidder 121 Hendey Machine Company, Torrington, Conn., \$1690; 166, Manning, Maxwell & Moore, New York, \$1660; 188, Niles-Bement-Pond Company, New York, \$1624 and \$2188.

Class 33.—One universal shaping machine—Bidder 86, Fairbanks Company, New York, \$470; 90, Walter H. Foster Company, New York, \$504.50; 188, Niles-Bement-Pond Company, New York, \$497; 204, Potter & Johnston Machine Company, Pawtucket, R. I., \$508; 209, Queen City Machine Tool Company, Cincinnati, Ohio, \$600.

Class 41.—One oxygen acetylene welding plant—Bidder 67, Davis, Bournoville & Co., New York, \$4500; 153, Linde Air Products Company, Buffalo, N. Y., \$3523.

Class 51.—One band sawing machine—Bidder 1, American Wood Working Machinery Company, Rochester, N. Y., \$250; 94, J. A. Fay & Egan Company, Cincinnati, Ohio, \$255; 96, Garvin Machine Company, New York, \$339; 195, Oliver Machinery Company, New York, \$338 and \$238; 271, White Tool & Supply Company, Cleveland, Ohio, \$377; 289, Fox Machine Company, Grand Rapids, Mich., \$344.

Class 52.—One patternmakers' lathe—Bidder 1, American Wood Working Machinery Company, Rochester, N. Y., \$255; 88, Fairbanks Company, New York, \$331; 94, J. A. Fay & Egan Company, Cincinnati, Ohio, \$310; 195, Oliver Machinery Company, New York, \$289 and \$324; 289, Fox Machine Company, Grand Rapids, Mich., \$283.

Class 53.—One swing cut-off sawing machine—Bidder 1, American Wood Working Machinery Company, Rochester, N. Y., \$80; 94, J. A. Fay & Egan Company, Cincinnati, Ohio, \$97; 195, Oliver Machinery Company, New York, \$105; 289, Fox Machine Company, Grand Rapids, Mich., \$85.

Class 54.—One patternmakers' extension bed gap lathe—Bidder 195, Oliver Machinery Company, New York, \$1342; 289, Fox Machine Company, Grand Rapids, Mich., \$868.

The following bids were opened November 30 for one 25-hp. electric motor and material for the Atlanta penitentiary:

Ridgeway Dynamo & Engine Company, Ridgeway, Pa., \$480; Holtzer-Cabot Electric Company, Brookline, Mass., \$545; Richmond Electric Company, Richmond, Va., \$532; B. F. Sturtevant Company, Hyde Park, Mass., \$650; National Electrical Supply Company, Washington, D. C., \$508; Burke Electric Company, Erie, Pa., \$474; Lincoln Motor Works Company, Cleveland, Ohio, \$551; General Electric Company, Schenectady, N. Y., \$454.25; Northern Electrical Mfg. Company, Madison, Wis., \$427; Peerless Electric Company, Warren, Ohio, \$552.70; Diehl Mfg. Company, Elizabethport, N. J., \$433.58; Crocker-Wheeler Company, Ampere, N. J., \$485 and alternate \$440; G. & W. Mfg. Company, New York City, \$773; Sprague Electric Company, New York, \$616.59; Electric Dynamic Company, Bayonne, N. J., \$625; Fred W. Walter, Norfolk, Va., \$490; Central Electric Company, Chicago, Ill., item 1, \$309; 2, \$22.50; 3, \$1.55; 4, \$15.80; 5, \$15; International Electric & Engineering Company, \$377.50 and \$438.91; Western Electric Company, New York, \$425.

Bids for ice making and refrigerating machinery for the United States naval station, Culebra, P. R., were opened on November 24, as follows:

Item 1. Refrigerating, ice making and cold storage plant operated on the ammonia compression system using an oil engine for motive power.

Item 2. Refrigerating, ice making and cold storage plant operated on the carbon-dioxide compression system using an oil engine for motive power.

Item 3. Refrigerating, ice making and cold storage plant operated on the ammonia compression system using a gasoline engine for motive power.

Item 4. Refrigerating, ice making and cold storage plant operated on the carbon-dioxide compression system using a gasoline engine for motive power.

Item 5. Under this item bidders may submit proposals for the complete work in accordance with the spirit of the specification, but with such modification of the methods and details as they desire.

Creamery Package Mfg. Company, Chicago, Ill., item 1, \$4400; 3, \$4270.

McCay Engineering Company, Baltimore, Md., item 1, \$3545; 2, \$2475.

Frick Company, Waynesboro, Pa., item 1, \$6660; 3, \$6500; 5, add \$270.

Pennsylvania Engineering Company, Philadelphia, Pa., item 1, \$7800.

Remington Machinery Company, Wilmington, Del., item 1, \$4715; 3, \$4262.

Kraeschell Bros. Ice Machine Company, Chicago, Ill., item 2, \$4728; 4, \$4378.

Under bids opened November 10 for machinery for the navy yards, the Independent Pneumatic Tool Company, Chicago, Ill., has been awarded class 123, one pneumatic piston drill and one improved pneumatic chipping, caulking and beating hammer, \$65.

Under bids opened November 3 for machinery for the navy yards, the Frevert Machinery Company, New York, has been awarded class 61, one improved tool and cutter grinder, \$360.

The following awards have been made for machinery for the navy yards, bids for which were opened October 27:

Niles-Bement-Pond Company, New York, class 111, one single traveling head shaping machine, \$2475.

Landis Machine Company, Waynesboro, Pa., class 112, one single head motor driven bolt cutter, \$760.

S. M. Price Machinery Company, Norfolk, Va., class 113, one floor grinder, \$138.

Vulcan Iron Works, Wilkes-Barre, Pa., class 1, one four-wheeled locomotive, \$4100.

The following awards have been made for machinery for the Isthmian Canal Commission, bids for which were opened October 12, Circular No. 468:

Manning, Maxwell & Moore, New York, class 2, one steam hammer, \$2040.

Brown & Sharpe Mfg. Company, Providence, R. I., class 3, one universal grinding machine, \$790.55.

Tucker Tool & Machine Company, New York, class 4, two upright drills, \$351.50.

Fox Brothers & Co., New York, class 5, one 36 in. by 24 ft. engine lathe, \$2840.

Garvin Machine Company, New York, class 6, one 14 in. by 6 ft. engine lathe, \$463.

Fairbanks Company, New York, class 7, one 14-in. engine lathe, \$609.

The following awards have been made for machinery for the navy yards, bids for which were opened November 17:

B. F. Sturtevant Company, Hyde Park, Mass., class 16, ventilating sets, \$4590.

Diehl Mfg. Company, Elizabethport, N. J., class 15, dynamos, \$1966.

Under bids opened November 23, Circular No. 476, for machinery for the Isthmian Canal Commission, the H. Mueller Mfg. Company, New York, has been awarded class 41, one water tapping machine, \$77.60, and Fox Brothers & Co., New York, class 42, one ratchet pipe cutter, \$43.94.

Warning.—When a stranger, holding no credentials from a known and responsible concern, offers to take subscriptions for any periodical at less than the regular advertised price, he should be recognized at once as a swindler. Every little while it is necessary to warn the public on this point. Men go round the country soliciting subscriptions and offering to give them for cut rates if they cannot get the regular price. With the offer of several high-class publications at a greatly reduced rate as his bait, a traveling solicitor giving his name as Bert L. Brown, has been victimizing residents of southern Indiana. He has no connection with the David Williams Company's publications and attention is called to the fact that our solicitors carry a receipt book of the company with credentials authorizing them to collect, signed by Benj. F. Stower, office manager.

The Great Lakes Engineering Works, Detroit, Mich., has closed a contract with the Inland Navigation Company, Hamilton, Ont., for a 500-ft. bulk carrier for delivery June 1. This vessel, which will bring ore from upper lake ports to Point Edward, just above Sarnia, Ont., and will also carry grain from Fort William to Buffalo, is said to be the first vessel built for a Canadian company for the lake trade at an American ship yard. The ore is to be used by the Hamilton Steel & Iron Company, which needs about 200,000 tons a year. With this order the Great Lakes Engineering Works has contracts for the construction of seven hulls for next year's delivery, four of which are bulk freighters, including a 600-ft. freighter for W. P. Snyder, Pittsburgh, two package freight steamers and one passenger steamer. Four steel scows have been booked for a dredging company.

All of the patents and the plant of the Rust Boiler Company, located in Midland, Pa., have been purchased by the Babcock & Wilcox Company. The latter company will continue to manufacture the Rust water tube boilers in the Midland plant, and will market them direct through its sales department.

HARDWARE

THE present session of Congress will certainly be very much crowded with business. It is likely that this fact will count against the passage of anything revolutionary in the line of parcel post legislation, but it is not safe for the merchants to remit or postpone their efforts. They cannot afford to take the chances. The pressure on the time of Congress for matters which must have consideration is attended, indeed, with a certain increased peril in regard to the establishment of a parcel post on the rural routes as recommended by the Postmaster-General. The peril is that the subject may not be maturely considered, and that to get rid of the matter for the time being a bill establishing an "experimental" parcel post, in connection with the rural free delivery, will be put through hastily, without full discussion and without giving the merchants an opportunity to marshal their forces in opposition. The only safe course to pursue is for the conservative business men to move at once in the matter, and let the Representatives in Congress and the public generally understand the serious objections which hold against the plan. There certainly should be an emphatic expression from the commercial classes to set over against recommendations of the President and of the Postmaster-General, so that the lawmakers may understand how the subject is regarded by the business men, and especially by the retail merchants of the country.

In this connection it is gratifying to observe the energy with which the secretaries and other officials of the various State associations are taking hold of the matter, circulating petitions among the merchants generally of the towns and villages, on the lines suggested in our columns and so admirably carried out in the petition from the merchants of Berlin, Wis., which was reproduced in our last issue. It is safe to say that if the retail merchants of the country in the various branches of trade should voice their opposition in petitions addressed to their representatives at Washington, it would settle the matter. The trouble is that while the merchants in conversation and in convention condemn the scheme, they fail to make their opposition known to the law makers. It is safe to say that not one in a hundred of the towns and villages throughout the country—probably not one in a thousand—has made clear, emphatic and united protest against this legislation. When this is done parcel post on the rural routes will be dead as a door nail.

With the complete understanding of a law which aims to protect the public interests there must always come the knowledge by which the dishonest and criminal person can best take advantage of its workings. Such is the case with the Federal bankruptcy act to-day. It has been operative long enough to be thoroughly understood in this aspect of its operation, as well as in its beneficent side. The insolvent debtor of the class which formerly understood how to serve best his own interests under the insolvency laws of the various States, has now found where he can make the Federal act serve his purposes in defrauding his creditors. The recognition of this condition is not to be regarded as a disparagement of the excellent bankruptcy act, which has placed creditors on a parity, regardless of their places of residence in the United States, and which protects the debtor against sub-

sequent proceedings from creditors in other States after he has been discharged purged of his obligations. But the evil exists, and quite as a natural outcome of the condition organized effort to circumvent crooked practices has begun.

A notable instance of this exists in the crusade which a Business Men's Association has begun against the fraudulent bankrupt. Convinced that various persons of the city have taken advantage of the law to work fraud and injustice to their creditors, inflicting losses on business interests, the association has directed its attorney to investigate all cases of bankruptcy brought in the city and to bring to the attention of the association any case in which evidence of fraud or hindrance appears to exist, the purpose being to prosecute in all such instances. Apparently there is room for this work. The Federal courts are stern in their efforts to enforce the law, but in the routine of its operation the greater part of the judicial contact with the bankrupt is through referees and trustees in bankruptcy, to whom the evidences of fraud may not become evident. The courts are prompt to take up all recommendations for investigations of alleged criminal act or attempt. The attorney for an association such as this would be listened to with interest, and his work would be appreciated by the United States district judges. The moral effect in a community should be a strong one. The dishonest business man or private individual would hesitate longer before attempting a fraudulent bankruptcy, or the concealment of assets should he be petitioned into bankruptcy.

Condition of Trade.

A diminished volume of business naturally characterizes the closing days of the year. With many retail merchants the holiday and winter trade is important and keeps the force in the store well occupied. Only occasional sorting-up orders are being placed for this class of goods, and as a rule the buying departments of the well ordered retail establishments are not placing many orders at present, except in lines for later delivery. Preparations are being made in most houses, large and small, for the annual inventory, which has so much significance in the balancing of the books when the results of the year's business are ascertained. This, too, has a repressing effect on purchases, as it is not desirable to add to the stock at this time. The fact that there is little in the condition of the market to indicate any general advance in prices in the near future, with, indeed, some uncertainties as to the effect of tariff legislation on business and values, removes almost entirely the inducement for speculative buying, so that purchases are as a rule limited conservatively to goods which will pretty surely be required soon in the regular course of business. With the replenishing of broken stocks, the belated buying of which there is always a good deal by merchants who unwisely deferred their purchases, and the placing of future orders, there is on the whole a reasonable volume of business going from the retail merchants to the manufacturers and the jobbers. Most manufacturers are still enjoying the opportunity of adding to their stocks on hand, and will probably enter upon the spring business with warehouses better filled than has been the case

during recent years. There continues to be a hopeful tone in the market, and a renewed activity during the early months of the new year is anticipated.

Chicago.

So far as the retail distribution of Hardware goods is concerned, business is beginning to reflect the drift toward concentration upon holiday lines. In the local trade there is a good deal of such buying already under way, and the outlook is promising for a very successful season. The anticipated slowing up of orders for immediate shipment is to some extent being realized by jobbers, but this has no further significance than that dealers desire to add no more to their stock than is necessary prior to the first of the year; whatever shortening of sales there may be on this account is offset by more liberal buying for forward requirements. Within the past few days Wire Cloth orders for spring delivery have been coming in quite freely; and it may be observed in this connection that the movement has started under favorable conditions as respects the maintenance of prices, a disregard of which has, at times in the past, undermined the confidence of buyers and retarded trade. Prices generally are unchanged, and while more or less irregularity exists in some lines, there is less disposition to make extreme concessions. Owing to the hopeful view of things generally entertained, it is safe to say that a better degree of firmness characterizes the entire market. While its effects are not yet apparent, the past few days of freezing weather, accompanied by snowfalls in some parts of the West, are expected to bring out belated orders for Sleds, Skates and other goods whose movement is dependent on seasonable weather. Notwithstanding the delayed appearance of ice and snow, the forward trade in Skates has been fairly good. It is interesting to note, however, that prolonged dry weather is likely to decrease the demand for Skates more perhaps than other causes; this results from the drying up of ponds and water courses which usually afford the common skating grounds throughout the country. Several large contracts for Builders' Hardware for Chicago buildings will probably be placed in the near future. The largest of these are the La Salle Hotel, the City Hall and the Blackstone Hotel. The former of these will require between \$60,000 and \$70,000 worth of such goods, while the specifications for the City Hall will amount to somewhere near \$50,000.

NOTES ON PRICES.

Wire Nails.—The diminution in the volume of business received by the mills in view of the proximity of stocking time is an annual occurrence, and is not now regarded as signifying any change in general business conditions. The Nail market appears to be in a satisfactory condition, and a healthy demand after the first of the year is looked for. The market is firm, with the regular prices steadily maintained. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers.....	\$1.95
Carload lots to retail merchants.....	2.00
Less than carloads to jobbers.....	2.00
Less than carloads to retail merchants.....	2.10

New York.—There is a lack of regularity in demand in this market, shown by the varying amount of business transacted on different days. Nails are held on the basis of \$2.30 per keg in small lots at store, but some sellers are occasionally inclined to shade this figure.

Chicago.—The influences which usually retard trade to some extent toward the close of the year, are not materially affecting the movement of Wire Nails except in the timing of shipments for arrival after January first, when inventories will be taken. New business is quite satisfactory in volume, and everything seems favorable for further expansion after the first of the year, when the Southern trade is expected to open up with a good demand. The aggregate tonnage of Wire products entered by the leading interest last month was the largest for any previous November, except in the same period of

1906. Prices are unchanged, and are reported as being absolutely maintained. Quotations are as follows: \$2.13 in car lots to jobbers, and \$2.18 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—As we get closer to the end of the year, new orders in Wire Nails are growing smaller, due to the fact that jobbers and consumers alike desire to have as low stocks as possible before taking inventory and closing up business for the year. For the same reasons, specifications against contracts this month will no doubt show a falling off, as compared with November. The general condition of the Wire Nail market is healthy, prices are firm, and consumption is large. Based on present prices of Steel Billets, prices on Wire Nails are reasonably low, and with all these conditions existing, the manufacturers firmly believe that trade will open up actively very early in the new year, and that 1909 will be a very prosperous year in this trade. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$1.95
Carload lots to retail merchants.....	2.00

Galvanized Nails are quoted at \$1 over the price of the regular Nails.

Cut Nails.—Requirements are light at this season, and stocks beyond present needs are not being accumulated by jobbers, as no trouble is experienced in getting prompt shipments from mill. New business and specifications on contract orders are consequently not coming in as liberally as in November. In sympathy with general business conditions the Cut Nail market is showing more stability. The price for Steel Cut Nails is \$1.80, base, per keg, f.o.b. Pittsburgh, for less than carloads, and \$1.75 for carloads and larger lots. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

New York.—Cut Nails are moving in a moderate way, orders being confined to actual requirements, which are light. Steel Cut Nails are held on the basis of \$2.15 per keg for small lots at store, but this price is not strictly adhered to by all sellers.

Chicago.—Although purchases include only what is required for present needs, the general volume of business is slowly improving. Orders for prompt shipment are likely to be a little backward during the remaining weeks of the year, owing to the desire of jobbers to hold stocks down to a minimum until after inventories are taken. Prices are firmer, and but few, if any, concessions are being offered by the mills. We quote Chicago prices as follows: In car lots to jobbers, Iron Cut Nails, \$2.08; Steel Cut Nails, \$1.98.

Pittsburgh.—New orders are showing a falling off, due to the lateness of the season and also to the inventory period, while specifications against contracts are not coming in as freely as last month. A fair volume of new orders is being placed, but they are for small lots and actual needs. The condition of the market is firm, and we are advised prices are more stable than for some time. It is confidently believed that demand for Cut Nails will show a material increase very soon after the first of the year. The market is \$1.80, base, per keg, f.o.b. Pittsburgh, but \$1.75 is made on carloads and over. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

Barb Wire.—To the continued mild weather is attributed the fair demand for Barb Wire which characterizes the present month. Some new orders are being placed with the mills, also specifications on contracts are received. While the volume of business is not large it is somewhat in excess of what is expected at this season. According to reports regular prices are being maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.10	\$2.40
Retailers, carload lots.....	2.15	2.45
Retailers, less than carload lots.....	2.25	2.55

Chicago.—The demand for Barb Wire while not comparable to what is expected at the height of the season, is unusually good for this time of the year. When buying for the spring trade begins after the first of the year, an active business is looked for. Mill stocks are said to be exhausted, but with the present rate of incoming business orders are being promptly executed and shipped. It is stated that prices are being rigidly maintained by the mills. Quotations are as follows: Jobbers, Chicago, car lots, Painted, \$2.28; Galvanized, \$2.58; to retailers, car lots, Painted, \$2.33; Galvanized, \$2.63; retailers, less than car lots, Painted, \$2.45; Galvanized, \$2.75; Staples, bright, in car lots, \$2.25; Galvanized, \$2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The continued mild weather is no doubt the cause of some orders being placed for Barb Wire, which while not large, call for more tonnage than is usually placed at this season. Specifications against contracts are coming in fairly well, but it is probable demand for Barb Wire and shipments by the mills will show a falling off until spring demand opens up. The mills advise us that prices are being maintained and the tone of the market is firm. The Youngstown Sheet & Tube Company has completed the work of enlarging the plant at Struthers, Ohio, formerly operated by the Morgan Spring Company, and is now prepared to fill orders for Staples and Galvanized Barb Wire. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.10	\$2.40
Retailers, carload lots.....	2.15	2.45
Retailers, less than carload lots.....	2.25	2.55

Plain Wire.—Business is restricted to present needs, both in new orders and specifications on contracts received by the mills; regular prices are well maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of \$1.80 for Plain and \$2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.....	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....	\$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35	
Galvanized.....	2.10	2.15	2.20	2.25	2.35	2.45	2.55	2.65	

Chicago.—Consumers of Plain Wire are ordering liberally for current needs, but are not anticipating wants far in advance. There is a fairly good tonnage of new business coming out, of which the Fence manufacturers are contributing the larger part. The prospects ahead indicate the beginning of a more active demand soon after the first of the year. Prices, it is stated, are being firmly maintained. We quote as follows: Car lots to jobbers, \$1.98, f.o.b. Chicago, and to retailers, \$2.05.

Pittsburgh.—A fair number of new orders are being placed for small lots, but the large buying is pretty well over for this season. Specifications against contracts continue to come in a fairly good volume, but it is probable that business in Plain Wire will show a falling off until new demand sets in for the spring trade. This year has been a fairly satisfactory one in the Fence Wire trade, but, of course, was not as large as last year. The outlook for 1909 is good, the farmers having had heavy crops and have plenty of money with which to make improvements, such as the building of Fences and doing other work in which Plain Wire is used. We are advised that the tone of the market is firm and that prices are being maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of \$1.80 for Plain and \$2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.....	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....	\$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35	
Galvanized.....	2.10	2.15	2.20	2.25	2.35	2.45	2.55	2.65	

Twist Drills.—For some time past, the increasing irregularity of the Twist Drill market has commanded the attention of the larger trade. With business still in small volume as, indeed, it has been for several months, competition has grown keener and has led to important concessions even on the part of leading manufacturers, although some of the latter have pursued a most conser-

vative course. Several complications have entered into the situation, however, which seems to be coming to a head, as figures which have been regarded as *sub rosa* become more and more widely quoted.

Coes Wrenches.—For some time the jobbing trade have complained of a narrow margin of profit in handling the genuine Coes Wrenches, which on account of their recognized position are often used as leaders, causing active competition which has resulted in a frequent cutting of the jobbing prices to the retail merchants. This matter has been carefully considered by the manufacturers who are intending to do what they can to secure greater uniformity in the prices at which the wholesale houses sell the goods to the retail merchants, making it to the interest of the jobbers to avoid unreasonable cutting. The plan which has been decided upon to accomplish this will go into effect with the opening of the new year.

Dripping Pans.—Open competition continues to hold down prices on Dripping Pans, which may be quoted in a general way at a discount of 75 per cent. Additional concessions may be obtained by the jobbing trade.

Chisels and Auger Bits.—Conferences of both Chisel and Auger Bit manufacturers are scheduled for the near future. Business in both lines is said to show discernible improvement, and some makers express the hope that a little better prices can soon be secured.

Sash Cord.—A general advance of 1 cent per pound has been made by leading manufacturers of Sash Cord. The demand is good, and some makers of standard brands are unable to take care of all the business offered them. The market may be represented by a quotation on Nos. 8 to 12 of 22 cents per pound.

Oilers.—Prices on Oilers are not firm, especially on the copper plated goods. Discounts considerably below 75 and 10 per cent. are quoted to the largest retail trade.

Rope.—Cordage is moving in somewhat moderate quantities, as has been the case for a week or more. This is a natural condition for the time of the year, but contrary to the hopes of manufacturers. There is consequently considerable competition in obtaining orders and more or less irregularity in prices quoted on the lower grades of both Manila and Sisal Rope. The market is reasonably strong for small quantities of Rope at the following quotations: 7-16 in. in diameter and larger: Pure Manila, 8¾ to 9 cents; Pure Sisal, 6¾ to 7 cents. Mixed grades of both kinds grade down in price according to quality. Jute Rope, ¼-in. and up, No. 1, 6½ to 6¾ cents; No. 2, 6 to 6¼ cents.

Window Glass.—The committee on organization of the Imperial Glass Company has made public the fact that it has done about all the work possible, having secured either leases or operating contracts from all hand plants except 300 or 400 pots, and have promises of one kind or another from fully one-half of the latter plants. The signing of the preliminary papers required that practically every hand plant should sign similar documents before the signatures were binding. It is understood that one or two interests have positively declined to become identified with the proposed company, and that without their membership the committee can proceed no further. It is stated that buyers are showing less confidence in the market, and that prices are steadily working lower. On the sliding scale of wages, which is still in force, the average selling price for Glass is made the basis of wages paid. According to published reports the average selling price of Glass on the November settlement was as follows: Single strength, 90 and 31.75 per cent. discount; double strength, 90 and 36.05 per cent. discount. It is understood that Window Glass workers are dissatisfied with the small amount of wages they are receiving under the sliding scale plan and are talking of insisting upon a flat scale. Fifty or more hand operated factories are supposed to be in operation, and in the competition to dispose of their output prices have suffered. No official change in prices has become public in the American Window Glass Company's prices, for machine made Glass, of 90 and 35 per cent. discount on single and 90 and 40 per cent. discount on double strength Glass. At a meeting of the Eastern Window Glass Jobbers' Association, held

last week, no change was made in price, all sizes single and double strength Glass, covering territory east of Chicago, being 90 and 20 per cent. discount from jobbers' list, October 1, 1903. This price is more or less elastic, according to circumstances.

Linseed Oil.—The demand in this market is confined to actual requirements, which are light. Large consuming buyers are also supplying their wants in this conservative manner, so that the movement of Oil is restricted to limited quantities. Quotations in 5-barrel lots are unchanged, as follows: State and Western Raw, 47 cents per gallon; City Raw, 48 cents per gallon. Boiled Oil is 1 cent advance on Raw.

Spirits Turpentine.—The local price has fallen off $\frac{1}{2}$ cent per gallon during the week, owing to a comparatively light demand. Manufacturing consumers will close their plants within a few days for annual repairs and stock taking, and are therefore temporarily out of the market. The demand is confined to jobbing lots. The New York market is represented by the following quotations: Oil Barrels, 42 to 42 $\frac{1}{2}$ cents; Machine Made Barrels, 42 $\frac{1}{2}$ to 43 cents per gallon.

Holiday Trade in the Hardware Store.

THE CONSTRUCTION OF A CHRISTMAS WINDOW DISPLAY.

THE window display methods employed by Nelson S. Haskell, Lynn, Mass., are worthy of study and will doubtless prove suggestive to many Hardware merchants. The firm has two large windows and makes it a rule to trim one on Thursday of each week. The plan followed is always to show goods that the public requires immediately or will want soon, and it has been found that an effective display of some one line is to be preferred to a jumbled assortment. Displays are adapted to special seasons or occasions as they come around.

Displays Roughly Sketched.

Perhaps the most interesting of the methods employed by I. J. Haskell, who handles this department, is his system of making out in advance a plan of a display, so that when the time comes to put it in, the window dressers may go ahead rapidly with the work without wasting time in studying the general arrangement or wondering what they are going to put in next. Mr. Haskell usually takes pieces of wrapping paper and jots down the larger and more important articles or lines to be included in

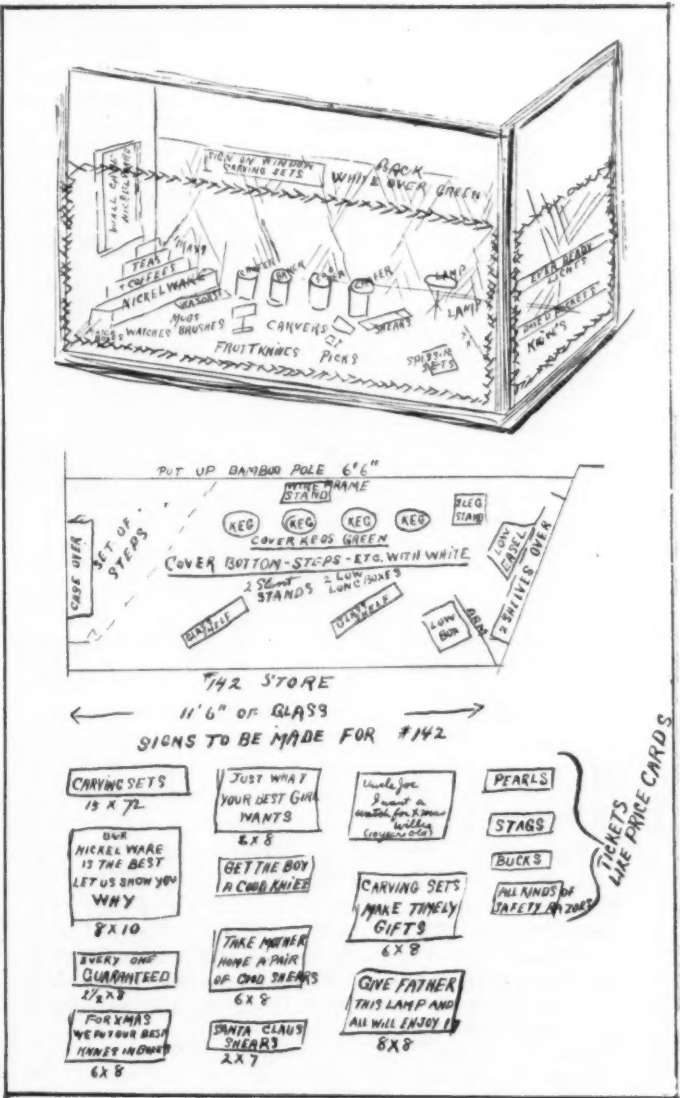


Fig. 1.—Rough Sketch Used as Basis for Holiday Window Display.

his display, sketching the idea out roughly and adding details as they come to mind. Sometimes, of course, the sketch is drawn over a number of times. He then takes up the matter of signs, noting what will be required, and also makes a note of and has constructed any boxes,



Fig. 2.—Finished Holiday Window Display Based on Sketch Shown in Fig. 1.

stands or steps of special shape. In the store is a large stock of such stuff on hand, for everything is saved that promises to be of future use. There is a place reserved in the cellar for these supplies and in a closet are two racks, one for home made signs and one for display cards furnished by factories.

A Saving of Time and Labor.

The practical features of this method are obvious. The drawing does not need to be carefully done, and always saves much cogitating and considerable time and labor on "window day." The boy has the window cleaned out and washed by 10 o'clock in the morning, and usually noon sees it fully dressed if two men are detailed to work on it. Mr. Haskell has found that after a little experience his employees can dress the windows and carry out his ideas satisfactorily.

Making a Holiday Window.

Perhaps the most distinct and helpful information regarding Mr. Haskell's practical methods may be gained by the reproduction of one of his rough plans and the window display constructed therefrom. Such a plan of a holiday display used last year at this time is reproduced in Fig. 1, the final appearance of which is shown in Fig. 2. A comparative study of these two illustrations will indicate very readily the method of work. In addition to the rough plan and list of signs to be made, shown in the sketch, a list of the price cards required was also made up, which was as follows:

PRICE CARDS.

Red—Black Outline.

\$0.05.....1	\$0.70.....1	\$1.50.....5	\$4.75.....1
.10.....4	.75.....10	1.75.....1	5.00.....3
.15.....2	.80.....1	2.00.....4	5.75.....1
.20.....2	.85.....1	2.25.....1	6.50.....1
.25.....15	.90.....2	2.50.....5	8.00.....1
.40.....1	1.00.....15	3.00.....3	8.50.....1
.50.....12	1.10.....1	3.50.....3	10.00.....1
.60.....2	1.15.....1	4.00.....2	12.00.....1
.65.....1	1.25.....5	4.50.....2	16.00.....1

A great deal of stress is laid on the matter of signs and price cards, which are carefully prepared, freely used and are found to be very valuable in increasing the selling power of the display.

Hardware Organizations.

North Dakota Retail Hardware Association.

Through an error on the part of the association, the dates of the next annual meeting of the North Dakota Retail Hardware Association were announced as January 28, 29 and 30. The time selected, however, is Tuesday, Wednesday and Thursday of the last week of that month, making the dates January 26, 27 and 28. As already noted, the convention will be held in the Commercial Club rooms in Bismarck, and the official headquarters, where Hardware exhibits will be accommodated, will be at the Grand Pacific Hotel. C. N. Barnes, secretary, Grand Forks, will be pleased to furnish any information desired in regard to the meeting.

British Columbia Retail Hardware Association.

One of the most successful meetings ever held by the British Columbia Retail Hardware Association was that at New Westminster, on November 26, being second in point of attendance and interest manifested only to the annual convention held last April. There were present at the gathering delegates from Vancouver, Westminster and surrounding districts, and some important business was brought up.

Perhaps the most interesting subject discussed was that introduced in a paper by Mr. Owens of the J. A. Flett Company, on the British Columbia lien law, recently passed. This measure is in direct opposition to the interest of the Hardware and supply trade. One very objectionable feature is that the merchant must notify the owner of the property 15 days before the expiration of the time allowed for filing liens. This leaves the matter open so that unscrupulous contractors and others can get off without paying for their goods. The association appointed a committee to deal with this matter and to confer with sister associations with a view to obtaining

their support in having a more equitable lien law placed upon the statute books. The committee was given full power to draw up a suitable bill and secure legal advice upon the subject, making report at a special meeting to be called during December.

Another important subject dealt with was the matter of extended credits, and in this connection a committee was also appointed to secure data from other trade bodies, and ascertain the steps taken by them in the handling of long credits.

Inland Empire Implement and Hardware Association.

The recent completion of a splendid State Armory at Spokane, Wash., has made it possible for the Inland Empire Implement and Hardware Association to secure for its use a building admirably adapted to the needs of the Hardware, Implement and Vehicle exposition, which will be held in connection with the annual convention on January 20, 21 and 22, as already announced. The armory has a main floor space of 14,500 sq. ft., has broad galleries on three sides, is well lighted and heated, and conveniently located. This exposition is the first one of its kind ever attempted on the Pacific Coast. A diagram of the exhibition hall has been issued by E. W. Evenson, secretary, Spokane, indicating that 76 spaces are available, ranging in price from \$10 to \$30, according to size and location. Following the meeting of the Inland Empire Association will come the second annual convention of the Pacific Federation of Implement and Hardware Associations, embracing Montana, Idaho, Washington, Oregon and California, which will be held in the armory on January 22 and 23. The two conventions, it is believed, will insure a large attendance of retail merchants from the Pacific States, especially Washington, Idaho and Oregon.

South Dakota Retail Hardware Association.

The South Dakota Retail Hardware Association, H. E. Johnson, Redfield, secretary, has issued a circular in regard to the Hardware exhibition which will be held in conjunction with the annual meeting at the Auditorium in Huron, March 2, 3 and 4. A diagram of the hall is presented and prices ranging from \$11 to \$18 are given on the 49 spaces which are available. The prices mentioned include the furnishing of framework for the booths. It is suggested that reservations for space will be made in the order of their receipt and that applicants make first, second and third choices. Any information desired in regard to the exhibition will be cheerfully furnished by Mr. Johnson. The business sessions of the convention will be held in an adjoining hall between the hours of 1.30 and 6 in the afternoon. The exhibition in the auditorium will be open from 8 a.m. to 1 p.m. and from 6.30 to 10 p.m.

Pennsylvania Retail Hardware Association.

Extensive plans are being made by a committee, consisting of prominent Hardware merchants, jobbers and manufacturers, for the annual convention of the Pennsylvania Retail Hardware Association, which also extends its membership into New Jersey, Delaware and Maryland, which will be held in Philadelphia on February 10, 11 and 12. At a meeting last week arrangements were partially completed for the convention. The headquarters will be at the Bellevue-Stratford Hotel and at the First Regiment Armory an exhibition of Hardware and related lines will be made by manufacturers and jobbers. The committee having the arrangements in charge consists of F. C. Goodwin, chairman; J. A. Supplee, J. H. Bonbright, H. J. Fueller, Charles Asbury, Robert L. Sheppard, C. B. Lowber, Mark B. Taylor, William B. Parker, George Holmes, John R. Griffith, William B. Charlton of Philadelphia, and W. P. Lewis of Huntingdon, secretary of the association.

THE COES WRENCH COMPANY, Worcester, Mass., has issued an attractive cardboard hanger made up of three parts attached by fine chain. The words Coes Wrenches are in red and white cut out letters, and between them is hung a cut out Wrench 12 in. long in natural color. The sign is unusually original and striking, and will doubtless be used by the trade with good effect.

THE PARCEL POST QUESTION.

PETITION FROM DAYTON MERCHANTS.

IN our last issue we presented a fac simile of the petition in opposition to parcel post legislation got up by C. A. Peck, Berlin, Wis., in accordance with the suggestion of the editorial in *The Iron Age*, November 26. This petition bore the signatures of practically all the business interests of the town, and has attracted much favorable comment. The example of Berlin has been followed by a number of other communities, and it looks as if many other petitions of this sort will be prepared and forwarded to members of Congress.

A. L. Shearer of Dayton, Ohio, president of the State Hardware Association, called a meeting of the Hardware merchants of Dayton on Tuesday, 1st inst., at which it was decided that a vigorous protest should be made against legislation in the interest of parcel post. The following resolutions were adopted:

Resolved, That it is our unanimous conviction that the establishment of parcel post routes by the Government will seriously interfere with the proficient transmission and delivery of our first-class mail matter, the postage upon which we believe should be reduced. We believe also this measure will largely increase the already large Post Office deficit, and will eventually produce very material injury to the great retail business of our nation, which has been and is at present a most important factor in promoting the commercial and educational life of the various commonwealths wherever situated. We therefore further,

Resolve, That our next Congress and Government officials be strongly urged not to enact any laws which shall produce such harmful results to so large a class of our most enterprising and respected citizens who have in the commercial activities of our nation proven themselves to be benefactors.

These resolutions, which will be sent to the representative of the Dayton district in Congress, were signed by the Hardware merchants of Dayton as follows:

Kramer, Vlot & Co.
H. E. Emrick.
Roney & Shearer.
H. H. Bodey & Co.
W. L. Banker.
P. E. Coffman.
Hunter & Reynolds.
Chas. J. Sherer.
Longanecker Bros.

Geo. W. Tischer.
John F. Baker.
C. L. Kimmel.
Geo. Grabedinkel.
Frank Hamburger.
Mahlmeister Bros.
Rice Bros.
Adam Bretch.

Mr. Shearer advises us that the Hardwaremen of the city have the assurance of officials connected with the grocers, druggist and shoe and clothing men's associations that they will join in this protest, and it is expected that united action on the part of nearly all the business men of the city will be taken in the near future.

A PETITION FROM IDAHO.

THE Hardware and implement merchants of Idaho have also been moving energetically in the matter and we are advised by J. F. Cook of Boise, secretary of the association of that State, that the following petition is being circulated:

To the Members of the Idaho Delegation in Congress:

The Idaho Retail Hardware and Implement Dealers' Association, comprising in its membership many of the leading business men of southern Idaho, have had under consideration and for more than a year past have made extended effort to combat the views of the Postmaster-General of the United States, Mr. Von Meyer, in his seeming determination to put into effect a parcel post law similar to those in operation in some foreign countries.

We take the position that this proposed parcel post is but an entering wedge in favor of catalogue house competition with the country merchant, and

that this class of business concerns will in time be the real beneficiaries of such a law—and this to the detriment of all rural business houses and to the country store keeper—and that all the people of Idaho and every other Western State will in the end be injured instead of benefited should such a law be put in effect.

Our now growing and prosperous village communities would in time cease to expand and the country store would not long be needed to supply the wants of the people in its vicinity, the wants of the farmer and producer. Should the United States Government become a cheap, common carrier, it would only be a matter of time until the buying of a large proportion of the merchandise needed by our citizens would gravitate to the great department stores and catalogue houses of the large cities located in the great Eastern commercial centers.

Believing that the best interest, not only of Idaho business men, but the real business welfare of all our citizens, rests in the defeat of parcel post, we therefore pray that you use every honorable effort to defeat the enactment of such proposed parcel post law.

This petition contains columns for the entry of the name, business and address of the signers. Not only are the Hardware, Implement and Vehicle merchants asked to join in this protest, but merchants in all lines and other influential persons are being canvassed for signatures. The petitions when ready will be forwarded to the Idaho Congressional delegation.

PETITION FROM NEW YORK STATE.

UNDER date of the 7th inst., John B. Foley, Syracuse, secretary of the New York State Retail Hardware Association, has sent out a circular accompanied by the form of petition suggested in the last issue of *The Iron Age*, as follows:

_____, N. Y., December __, 1908.
To _____, Member of Congress:

We, the undersigned, in business in _____, N. Y., enter our earnest and emphatic protest against the establishment of a parcel post on the rural routes and against parcel post legislation in any form.

We regard the carriage of merchandise in the mails on the rural routes as not only open to many serious objections on the ground of expense and public policy, but desire to emphasize the fact that, while it would be greatly to the advantage of the catalogue houses and the department stores of the large cities, it would be detrimental to our interests and to the business welfare of the smaller communities.

A stub at the top of the petition form suggests that the recipient sign the petition and then circulate it among other merchants, getting as many signatures as possible and mailing the petition promptly to the district Congressman.

The circular is also accompanied by a reprint of the editorial on parcel post objections which appeared in our issue 26th ult. Following is an extract from that portion of the circular relating to the subject of parcel post:

*I inclose herewith a reprint of an editorial in *The Iron Age* of November 26, on the subject of parcel post.*

I think it proper to say at this time that while the Hardware trade were first to recognize the gravity of any such legislation, we are not alone in opposition to this pet scheme of the Postmaster-General; the National Grocery and Drug associations, as well as the Commercial Travelers' associations, have recently expressed their disapproval of the plan, and are using their combined influence to accomplish its defeat.

I would suggest that you interest the merchants in all lines in your community and endeavor to organize a united opposition to the Postmaster-General's request for permission to establish an experimental rural parcel post.

An excellent plan would be to write your Congressman at once and have your neighbors do likewise, expressing your opposition to the plan, and urge him to use his influence against such a measure.

RURAL FREE DELIVERY AND RURAL ROUTE PARCEL POST.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., December 8, 1908.

THE annual report of the Fourth Assistant Postmaster-General, which has just been made public here, contains some exceedingly interesting details regarding the rural free delivery service and the department's project for the establishment of a limited parcel post on rural routes. Mr. De Graw, the head of this branch of the postal service, has become an enthusiast in advocacy of the Postmaster-General's plan, but it is significant that he excludes from his report the optimistic estimates of the alleged revenues that would be derived from the handling of merchandise in the rural service, which form so conspicuous a feature of the Postmaster-General's annual report.

Growth of Rural Delivery During Twelve Years.

Mr. De Graw states that on June 30, 1908, the rural service was in operation on 39,277 routes and 39,143 carriers were employed. During the year 1672 new routes were established, which was a smaller increase than in any recent year. In this connection Mr. De Graw submits the following table showing graphically the growth of rural delivery during the 12 years of its existence:

Fiscal year.	No. of carriers.	Appropriation.	Expenditures.	Inc. in expenditures.
1897.....	83	\$40,000	\$14,840	.....
1898.....	148	50,250	50,241	\$35,401
1899.....	391	150,032	150,012	99,771
1900.....	1,276	450,000	420,433	270,421
1901.....	4,301	1,750,796	1,750,321	1,329,888
1902.....	8,466	4,089,075	4,089,041	2,338,720
1903.....	15,119	8,580,364	8,051,599	3,962,558
1904.....	24,566	12,926,905	12,645,275	4,593,676
1905.....	32,055	21,116,600	20,864,885	8,219,610
1906.....	35,666	25,828,300	25,011,625	4,146,740
1907.....	37,582	28,350,000	26,747,000	1,735,375
1908.....	39,143	34,900,000	.....	.....

Rural Route Parcel Post.

Concerning the department's project for the delivery of packages on rural routes, Mr. De Graw says:

In the early days of rural delivery the carriers were encouraged to engage in carrying express matter for hire and were permitted to act as agents for newspapers, the purpose being to augment the then small compensation allowed. There was little restriction of this privilege, and from July 1, 1902, until July 1, 1904, the law expressly provided for it. Thus it was possible for the public to secure the transmission of matter outside the mails by rural carriers at a low rate because of their employment by the Government. Complaints followed to the effect that if allowed to act as agents for newspapers it was only fair that carriers also be allowed to accept other soliciting agencies. It was urged, therefore, that rural carriers be prohibited from doing an express package business; be restricted while on duty to their official work, and be allowed a compensation commensurate with the service performed. Congress consequently provided for increased salaries for rural carriers, prohibiting them from acting as agents, and provided that rural carriers

shall not, during their hours of employment, carry any merchandise for hire: Provided, That said carriers may carry merchandise for hire for and upon the request of patrons residing upon their respective routes whenever it shall not interfere with the proper discharge of their official duties and under such regulations as the Postmaster-General may prescribe.

Believing that commissions performed by virtue of this provision of law should not include anything which might be transmitted by mail, the regulations promulgated so provided; and rural carriers are not permitted to carry for hire any matter or package that is mailable. Since the above restrictions have been enforced the Congress has, in line with the recommendations of this department, again increased the salaries of rural carriers. This increase was allowed in view of the enhanced cost of horse feed and to make the compensation adequate to the service performed.

The demand for a package service by rural carriers, which was fostered in the first years of rural delivery, still exists. It presents an opportunity to increase the usefulness of the postal service to a large class of its patrons, and should be met, not in the old way, which permitted the use of the Government's agency for private gain, but by the establishment of a system for the carriage of merchandise by rural carriers at such rates as will be a fair compensation for the service performed, the revenues to be credited to the postal receipts. The present fourth-class rate is pro-

hibitive as applied to the transmission of merchandise on rural routes. Patrons and merchants desire to have small packages of merchandise delivered by rural carriers, but will not pay the fourth-class rate.

Such a service would be beneficial alike to the patrons of rural delivery and local merchants, without injuring or competing with any other service. It can be given with the facilities now employed and would materially increase the revenues of the department. A special reduced rate of postage for merchandise carried only by rural carriers, such as you have recommended, would unquestionably be of material value to the retail merchants on rural routes and at rural delivery distributing centers, as well as enhance the influence of the rural service in making life in the country more attractive.

Rural Service Expenditure.

That the conservative estimates of the department for the increase of the rural service are not very reliable is shown by the Fourth Assistant's figures for the coming fiscal year, for which Congress will make appropriations this winter. The amount appropriated by Congress for the current year was \$35,873,000, or an increase of \$973,000 over the amount allotted for the fiscal year 1908, but \$300,000 less than the estimates. During the past few months, however, petitions for new service have been pouring in at a materially increased rate and in addition the cost of maintaining the service has risen as the result of the department's practice of increasing the salaries of carriers in proportion to the current increase in the patronage of their routes. For the coming fiscal year it is estimated that the average salary of rural carriers of all classes will be not less than \$867, as compared with a possible maximum of \$900, and on this basis Mr. De Graw asks for \$36,246,000, although he states that to meet all approved demands for service the amount should be not less than \$37,599,000.

A LETTER TO THE PRESIDENT.

THE letter given below was recently sent to President Roosevelt by a Pennsylvanian who is known throughout his State from his success as a merchant and his prominent identification with business and commercial bodies. We take pleasure in giving it a place in our columns as an interesting and forcible presentation of some of the more formidable objections to parcel post legislation.

If press reports are to be relied upon extraordinary pressure is being brought to bear upon you to induce you to strongly urge the Postmaster-General's cherished parcel post measures, and this is why I take the liberty of saying to you that as a native American, Pennsylvania born, one who loves his country and is proud of his native State, one who followed the flag at 16, and who would do so again at 62, should like contingencies arise, and now from the standpoint of plain American citizenship, and one who was a member of the Republican national conventions that nominated McKinley and Roosevelt, I, by your leave, call your attention to the following facts:

Postmaster-General Looks at One Side of the Question.

I believe, as do the large majority of all good Americans, that you as Chief Executive of the Republic desire to be fair to all the people, for all of your official life has been a living evidence of that fact, and, while I have no reason to doubt the sincerity of the present Postmaster-General in his belief that he is entirely right in advocating and at all times persistently urging parcel post legislation, yet I very much fear that he sees but one side of the question, and that he is overzealous in the matter, and fails to see the great wrongs that could and would accompany its adoption, and in the language of the first Postmaster-General of the Republic seems not to realize that the country might be paying too dear for the whistle. For surely all that you as President or the Postmaster-General need to do to convince yourselves that domestic parcel post would work great injury to our general prosperity is to carefully study the proposed methods and the logical results. For there would follow evils in its train, great evils, that would be to the direct damage of millions of the very best citizens of the Republic, and this injury would surely come, not

only to the mercantile interests of the country, but to the home and property interests of every inland town, village and hamlet, and the surrounding country adjacent thereto (we cannot help but believe that the unbiased farmer will agree that good roads are to be preferred before cheap mail order transportation of merchandise), for surely the purpose of the great postal service is to facilitate communication among the people in their social, business and political relations, and not to transport commodities at the public expense. The purpose of the merchandise rate for small packages is to enable the people to send these to each other readily and cheaply and not to afford to manufacturers and traders a cheaper method of distributing their wares to customers.

Privileged Class Benefited.

The adoption of parcel post would certainly benefit a privileged class in the larger cities. The smaller merchants, farmers and mechanics and their families would suffer the most, for with the United States Mail Service acting as a delivery route for merchandise from the large cities, we will most likely have a repetition all over the land of the ruin and decay as described in Goldsmith's "Deserted Village." Parcel post once thoroughly established means the substitution of a few monstrous business houses in the large commercial centers instead of the many thousands of independent business ventures that encourage industry, promote business training, spread prosperity and create property values all over the Republic.

Means Concentration of Capital in Large Centers.

Parcel post means more concentration of capital in the large cities, where the home life is not so pure, not so sturdy, not so thoroughly Americanized, as the home life of the smaller towns and villages—for there live the common people, the bulwark of the nation and of all the nations of the past; from the common people came Jesus of Nazareth and Abraham Lincoln. This concentration in the large cities of course means more monopoly of trade, and all the adjacent evils belonging to such conditions, and will sooner or later give these selfish interests the power to gradually undermine and practically ruin the present merchandise distributing system, that through all the years of the life of the Republic has brought progress, enterprise and prosperity to the country at large, representing many millions of invested capital, which in these years has been and still is an incentive to every self-respecting young man or young woman, for them to avail themselves of the open door of business opportunity in their own community, and which door would be closed to them and our widespread inland mercantile interests reduced to the level of the inactive and poor mercantile conditions which now exist in the towns and villages in about all European countries that have had the parcel post for any number of years.

I am sincere in saying and believing that you, as the Chief Executive, will hesitate to recommend it after you have investigated this matter of vital importance in the impartial and fearless manner in which you usually investigate all matters of public interest and public good. Your administration has won the confidence, the respect and the admiration of millions, in your fidelity to duty, in contending against the control of industry and trade by great combinations that tend to monopoly and the extinction of competitive effort, and, while there is a general depreciation of the tendency to draw population from rural and village life and mass it in congested centers, it seems like a poor policy to lend the service of the Government to both these tendencies, as the parcel post certainly would do.

Powerful Interests at Work.

Powerful interests are now without doubt systematically working on petitions from all over the Republic to be mailed to Senators and Representatives urging their support of the Postmaster-General's innovation, which, I fear, is viewed purely from an administrative standpoint, and the head of this great department in his laudable desire to increase what he no doubt sincerely believes is the usefulness of his department gives little or no consideration to the important economic questions involved, and which appeal so strongly to many

thousands of our very best citizens, who are opposed to paternalistic legislation in any form, for it is obvious that what might appear to be a success from an administrative standpoint would be an abject failure, and in a sense a tragedy from the standpoint of an important class of deeply wronged citizens.

In the coming session of Congress members of the House and Senate will be importuned as never before to favor parcel post. Some of the older members who have been active in opposing this measure in the past have failed of re-election, Chairman Overstreet of the House Committee on Post Offices and Post Roads among them. You no doubt will satisfy yourself as to the cause. There are also other facts which you can prove upon investigation, among which is the fact that commercial interests that would be benefited are many and powerful. They include the large catalogue houses and about all the large department stores. These interests are found nowhere else but in the large cities, and many manufacturers and publishers who are deeply interested in the passage are all actively working for its adoption. Surely the United States Government mail service was never intended as a common carrier of merchandise.

Hoping you will receive this communication in the same spirit in which it is sent—namely, free from selfish motives of any kind, and from one who would shrink from notoriety in the matter, yet from one who is thoroughly in earnest and thoroughly sincere in saying and believing that more harm would come from its adoption than good, and while I believe that Postmaster-General Meyer is one of the best Postmasters-General this country has ever had, I also believe that his recommendations as to parcel post require the fullest investigation at the hands of the Chief Executive and the national legislators as well.

LETTERS FROM THE TRADE.

Farmers Should Be Enlightened.

To the Editor: Your editorial on parcel post objections is right to the point. I believe if the proper sentiment could be worked up throughout the land that the farmers would be able to see that it would be against public policy to have a parcel post on the lines proposed by the Postmaster-General. There is no doubt that it would injure retail merchants, and it would certainly injure the farmers to nearly the same extent in the depreciation of the values of their property.

PACIFIC COAST.

Small Retailers Would Have to Consolidate.

To the Editor: We were reading in your paper an argument that the revenue from parcel post from the rural route offices would not wipe out the deficit in the Post Office Department. Now we take the position that it will and more, too. Not the postage on the goods sent the farmer, but on the catalogues, circulars, letters and all that is necessary to make a catalogue house of every retail store that might want to exist.

And we retailers are not in a position to stand the extra expense. So the first thing that would happen would be the necessity of consolidating a number of retail stores into one large department store at each post office, to be run on the latest improved plan for the making of money for the corporation.

Now this may be for the best for the community at large, so may Socialism, which parcel post will hasten.

I think the Postmaster-General has seen the possibilities of the added income from this source from a different standpoint than most of us. It would be well to look at it from all sides.

OHIO.

P. O. Deficit Will Not Be Wiped Out Very Rapidly.

To the Editor: We do not see how the rural route parcel post is going to wipe out the deficit in the Postal Department as the rural carriers will undoubtedly demand and receive more pay than they now get, as they will be obliged to equip themselves with heavier rigs and be obliged to have more horses. The pay the carriers now get hardly leaves them fair wages after buying horses

and feeding them. If they carry more mail matter than they do now they must have heavier wagons and more horses, and if they do not carry more the deficit will not wipe out very rapidly.

At the suggestion of the secretary of the State retail Hardware association we have written the Representative from this district and have obtained his promise to oppose parcel post in any form. If merchants generally will do this in every district we need have no fear of the outcome.

ILLINOIS.

Retail Merchants Would Have to Prepay Transportation.

To the Editor: Now that the final session of the Sixty-first Congress is assembling, the Postmaster-General will no doubt renew his activity for the enactment of his pet scheme, parcel post. Why would it not be more proper to call it a freight or merchandise post, for that is what it would eventually lead to? The only difference would be that instead of the receiver paying the freight, as is done in most cases, the sender would be compelled to do it, and in the present measure before Congress applying to rural routes only the retail merchant would have to be the "Jones, he pays the freight," in every instance.

Do you think for a moment that when the country merchant charges the cost of postage to the consumer the latter will often stand for it? Will not his competitor, who may be better able to stand it, advertise to deliver free on rural routes? Uncle Sam does not do a credit business in postage stamps, and the postage that is put on all goods ordered over telephone from some farmer customer 6 or 8 miles from the village store, to be sent by the rural carrier and charged to his account, is not paid sometimes for from three to six months.

Parcel Post Will Require Increased Equipment.

The \$16,000,000 deficiency in the Post Office Department the past year was largely occasioned by the expenditures of the rural free delivery department. The Postmaster-General figures that the increased income from a rural parcel post will largely overcome this deficiency. Does he think for a moment that the rural carriers will be able to equip themselves at their present small stipend sufficiently to run a dray line in connection with their present facilities? Will not the present cost of delivery be more than doubled? Is not the present arrangement by which carriers are permitted to deliver packages in excess of 4 lb. without postage, and at a nominal charge, more advantageous to the retail merchant?

I trust that every retail merchant will put these questions to his Congressman and have him answer them by his negative action when it comes to a vote before Congress.

Last of all, will not the large mail order houses and other similar concerns make a plea that this is class legislation and should be applied to the universal postage system? In all probability the Supreme Court would sustain a contention of this kind. We say let well enough alone.

NEBRASKA.

THE WISCONSIN LEGISLATURE at its coming session will be asked to make an appropriation for operating the twine factory in connection with the State Prison at Waupun, which is rapidly nearing completion. The appropriation will be necessary to purchase raw material for starting the plant as soon as the machinery is installed. The factory will employ from 80 to 90 prisoners. The machinery will be installed by the Watson Machine Company, Paterson, N. J. It is planned to interest the farmers of Wisconsin in the growing of hemp, so that the entire material manufactured will not have to be purchased in Central America. The operation of the plant will be under the direction of the State Board of Control. At the regular March meeting each year the price of the product will be fixed, and prior to the first of June twine will be sold only to farmers or actual consumers.

JOHN SHEAR & SON, Bloomfield, Ind., have purchased the Hardware business heretofore owned and operated by Gordon E. McCracken.

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Correspondence.

The Cash System vs. the Credit System—Which Is the More Profitable to Hardware Merchants?

To the Editor: For the past 10 years the trade journals have contained columns explaining the benefits of selling for cash only, and hardly a week passes without some one explaining the pleasure, and beauty and the certain prosperity to be derived therefrom. I have often wondered why some one did not try to prove that greater net profits can be realized from the credit system in retail Hardware stores.

Good Credit Man Necessary.

In the first place, no business firm, wholesale or retail has any right to extend credit, unless it has a good credit man, and by "good" I mean in a retail store one who knows the customers fully, who can refuse credit without offending, and who must be able to collect promptly without driving away trade. We all know of merchants who do not have the "knack" or faculty of collecting past due accounts without giving offense and thereby driving customers to their competitors.

Making Collections.

Jobbers sometimes make the same mistake. A few years ago I was in a retail merchant's store while the proprietor was opening the morning mail, when he shortly said, "Well, here are two letters from the two jobbers I buy most from, and they both want

The Wrong Way. money. One letter states that they are not bankers and are not loaning money; that the bill is now past due and they must be

paid at once. The other letter says that they appreciate my trade and other nice things about me, but explain that they have some heavy bills to meet on the 10th of the month and would appreciate my paying this past due account, as per statement. If I cannot pay it all they ask me to at least make a liberal remittance. I owe each one about the same amount, but one is so mean about the demand, and the other so gentlemanly, I will pay the latter, and hereafter they will get the bulk of my trade." In watching this merchant I found that he lived strictly up to his promise.

I know a Hardware retailer who rarely made a collection that he did not offend his customer, and it resulted in practical failure for him, as he started in the retail Hardware and lumber trade in a small Western town with \$20,000 cash capital; he was not extravagant in any way; he was not speculative, and neither did he have expensive habits, but when last I heard from him two years ago his property was nearly all gone and he was clerking in a retail grocery store.

Greater Profits in a Credit Business.

Such people should do an absolutely cash business, but with a "good" credit man and collector, if the capital will permit to adopt the credit system, far greater profits can be realized therefrom. Credits should not be given to such an extent as to prevent dis-

Take the Discount. counting bills, for it pays to borrow money at the bank, paying even 7 per cent. or more, to get the discount, and no up to date merchant will loose this profit. It is better for a clerk to do the collecting for a retail store rather than the proprietor, if this can be arranged and the clerk is diplomatic. When a customer opens an account it is always best to

have some understanding as to when settlement is to be made. If a farmer opens an account in the spring, and upon inquiry as to approximately when payment will be made, say, September 1 is agreed upon, it gives a good excuse to take the matter up nicely at that time and either get cash or a note. I believe prompt settlements to be the essence of good business.

More Goods and Better Quality.

Twenty-five per cent. more goods can be sold under similar conditions with the credit system than by the

cash system, and at an average of 5 per cent. better profit and generally of a better quality. Estimates made in regard to the amount of purchases made by the women vary from 50 to 75 per cent. of the household goods, and

Women Don't Have the Cash.

usually they are not the ones who carry the pocketbooks, and with quite a few of them it is not agreeable to get the cash from the husband, even for small purchases, much less for a stove or refrigerator, and yet they are invariably the ones who make the selections. But how easy it is for them to make the choice and say, "Please charge this to Mr. Jones." A short time since

I saw two young misses go into a dry goods store and look over some goods for one of the girls. They inquired, "Is this the best you have?" and receiving an affirmative reply, selected what they wanted without the price even being mentioned, simply saying, "Send this out to the house and charge to papa, please." Had this been a cash transaction, would not these young ladies have scrutinized the prices as carefully as they did the goods? Would they buy half as much if they had to pay cash?

Last fall an acquaintance told me on moving from his late place of residence that he went to a large department store to "settle up," and when the bill was rendered it fairly took his breath away. He had a large family of girls who had unlimited credit, and "run up" during two years a bill of over \$5000. This "papa" and "husband" was easy. The wife and daughters were liberal buyers, and the department store manager was delighted. How much less, do you imagine, these purchases would have been had it been a "cash as you go" transaction?

Nearly all the large stores, such as John Wanamaker and Marshall Field, extend almost unlimited credit to those known to be worthy of credit, and it is quite common for the clerks to inquire of a lady purchaser "do you want this charged?" and if an affirmative answer is given the clerk sends the check to the office for approval, and if the check is returned O. K.'d the sale is made and no cash is paid. We will buy more and usually better goods when we "run a bill" than when we count out the money every time we make a purchase.

Mail Order Business Not Parallel.

The argument against credit systems which has been much used in the past is that the mail order houses sold for cash, but their case is not a parallel one. From every section we hear that the catalogue houses are not causing the Hardware trade the annoyance they formerly did, and in some places the trouble has entirely disappeared. Resorting to cash did not bring about this

change, but the retail Hardware associations have done more than all else in showing the catalogue houses' methods, and devising methods and means to meet them, especially cautioning the retailers against asking 200 and 300 per cent. profit on small items, as many were accustomed to do. For instance, I have before me a bill from a retail "dealer" charging 35 cents for a 6-in. common four-piece elbow, and 25 cents each for common 6-in. dampers, either of which can be bought by the smallest buyers for 60 cents per dozen. Such prices will drive even the retailer's friends to buy of the catalogue houses.

Uncalled-for Liberality.

Another practice quite common among country retailers is absurd—that is, "carrying" the farmers from spring until fall, and when Mr. Farmer "pays up" make him a present. He has not done the retailers any favor, but rather the retailer should receive the tribute for carrying the account *without* interest for six months. A "good" collector will impress upon the customer in a nice way so as to cause no offense that the customer is the favored one, and make him so appreciate it that he will continue trading there. If any one is to have presents it should be the cash customers. I have known Hardware retailers to buy half a gross or more of good quality Pocketknives for the farmers, to give out when

they "pay up" in the fall, thus paying a premium in the fall for carrying the account without interest, to show how the "carrying of the account" is appreciated, instead of the farmer showing his appreciation for having the account "carried" and for favors extended.

All in all, I thoroughly believe the credit system, properly handled, is far more profitable to the retail merchant than any cash system religiously adhered to.

ED. FORD.

White, Van Glahn & Co.

IN view of the demands incident to the rapid growth of their business, the old established firm of White, Van Glahn & Co. has been incorporated under the laws of the State of New York. This concern which, with its predecessors, has been in the Hardware business since 1816, is one of the best known Hardware houses in the city, its main place of business being at 37 Barclay street, in a large new building, which is fitted up with every modern convenience. The old stand at Chatham Square, where the business commenced nearly a century ago, is still maintained, and it has a thriving trade.

Edward C. Van Glahn, the president of the new corporation, has been the managing partner of the house for 20 years. He is a well-known and prominent business man of ability and character, and is fully equipped with a practical knowledge of Hardware, and is familiar also with the broader questions of policy and finance. The treasurer, Otto C. Schiffmann, has been with the house for 13 years, first as junior clerk and gradually working his way up to general manager of the office. Louis M. French, the secretary, has been with the firm 11 years, for the past few years in charge of the mail order department, to the development of which much attention has recently been given. The directors of the new corporation are: H. Kirke White of Detroit, Mich., who is widely known by reason of his connection with large business affairs; E. C. Van Glahn, A. B. Haulenbeek, O. C. Schiffmann and L. M. French, the last four having been long identified with the concern, and having built it up to its present gratifying proportions. The new corporation starts in business with a capital stock of \$400,000, of which \$150,000 will be 7 per cent. preferred stock and the remaining \$250,000 will be common stock. All the common stock has been subscribed for in advance, as well as a large part of the preferred stock.

Mid-Winter Fair at Tampa, Fla.

WE are advised by W. K. Jackson, Lakeland, Fla., secretary of the recently organized Florida Retail Hardware Association, that he is authorized by the Florida State Mid-Winter Fair Association to announce to manufacturers, merchants and distributing agents in Hardware and related lines that they are invited to occupy space, for which no charge will be made, at the fair which opens at Tampa February 3, and continues until February 27. This fair will, it is said, attract thousands of tourists and winter sojourners as well as Hardwaremen, farmers, fruit growers, truckers, naval stores operators, mill men, phosphate mine operators and others. It is suggested that those who are desirous of securing space should communicate at once with Col. Thomas J. L. Brown, president, Tampa, Fla. The semi-annual meeting of the Florida Retail Hardware Association will be held during the period covered by the fair.

THE BILLINGS HARDWARE COMPANY, Billings, Mont., doing a wholesale and retail Hardware business, has under construction a new four-story and basement building 75 x 125 ft., for the exclusive use of its jobbing Hardware department. The building, which has track connections with three roads, will be equipped with elevators and a fire sprinkler system. It is expected to be ready for occupancy about June 1 next. When the increased space it will afford is available the company expects to enlarge all of its lines, and will in addition to a complete stock of Hardware, carry Pipe, Fittings, Bar Iron and Wagon Wood stock. The territory covered by its salesmen includes a large part of Montana and northern Wyoming.

Traveling Cutlery Displays.

THE traveling window display is now used by many manufacturers as furnishing merchants with convenient and effective means of calling attention to the manufacturer's lines and stimulating sales. Experiments with this form of advertising are being made this fall by the Bigelow & Dowse Company, Boston, in pushing the Pocket Cutlery of the New York Knife Company, Walden, N. Y., for which the house is New England agent. Considerable territory has been covered, and good reports have come from every display, indicating that customers have been interested in new patterns and in the possibilities of increasing their Pocket Knife business. Not only is there an immediate increase in sales, but an interest is created which may be expected to exert a continued favorable influence for the future.

In getting up the display the aim of Bigelow & Dowse Company has been to prepare something that could be adapted to any window of whatever size. A back and fore ground of red and green velour are provided with simple fixtures, enabling the decorator to arrange the Knives in various designs. About 650 Knives are furnished of all patterns, handles and prices. Every Knife is marked with a number, and in case a sale is made from the window, reference can be made to a price-list for the retail price.

The Bullard & Gormley Company's New and Enlarged Quarters.

A MOVE toward expansion of its business has been made by the Bullard & Gormley Company, Chicago, which for many years has occupied a prominent position in the local retail trade, having also in the meantime built up a growing jobbing business. Under a long term lease the company has secured a five-story building at 53-55 East Lake street, 45 x 169 ft., and a six-story building at 41-45 State street, 60 x 68 ft. These buildings adjoin at the rear, and on the State street side will be located the retail store, while the jobbing business will occupy the five-story building on Lake street. Some additional lines will be added to the retail stock, including a House Furnishings department, which will be installed in the basement, and a full line of Paints and Oils will also be carried. Particular attention will be given to the jobbing end of the business, which, owing to the increased space provided in the new quarters, will be strengthened by a fuller stock and more complete assortment than could be accommodated in the present store. The company expects to occupy the new site about May 1 next.

McLean Bros. & Rigg.

A. B. SEWELL AND J. W. MOLDEN, formerly managing directors of the well-known house of McLean Bros. & Rigg, Melbourne, Victoria, Australia, have lately severed their connection with the house. The financial position of this company was materially strengthened some 12 months since by the introduction of further capital by Thomas Luxton, who with his sons holds practically all the stock of the company. The business in future will be conducted on a cash basis, indents going through London or American commission houses of established reputation or direct to manufacturers. Several new department managers have been appointed, and the different stocks are being overhauled and brought up to date. The company will be glad to receive copies of catalogues and information as to quotations from all concerns handling goods in its varied lines.

THE STEWART IRON WORKS COMPANY, Cincinnati, Ohio, manufacturer of Iron Fence and Gates, Park and Lawn Furniture, and a general line of ornamental iron and wire work, has just issued its illustrated catalogue, No. 1, referring to stable fittings. The company has made this line for a number of years, but has made a specialty of large contract work, and the publication of this catalogue, which is its first devoted exclusively to this line, indicates a policy to expand its business in this direction.

Here and There in the Hardware Store.

BY SAMUEL MASTERS.

XI.—NEW SALESMEN AND THEIR CLIENTELE.

FROM the beginning care had been taken to make Mr. Martin feel that I was working under his direction, although in nearly every detail the outline was planned by Hartman Junior and myself before it was undertaken. After a scheme had been pronounced good and it had been thought best to adopt it Hartman Junior would pave the way for it in one of his morning talks with Mr. Martin, or I would suggest it to Mr. Martin, as seemed best, and in every instance it was adopted. Mr. Martin was anxious to have his sales increase and eager to adopt any plan which promised to achieve the end desired. He had a charming personality and was liked by every one who knew him—an exceptionally good salesman, but an indifferent manager. He liked to be given credit for all that was good in his department and seized upon and made his own any plan for improvement that was presented. My work was therefore considered by him with favor and had his hearty indorsement.

Mr. Martin's Move.

When I had finished the list of names of prospective customers and had secured a credit rating upon each, I turned the cards over to Mr. Martin for his further action. Hartman Junior found them upon his desk and asked Martin how he intended to cover the field thus opened.

"I don't know," said Mr. Martin. "I only have two men, and they can't cover one-third of the list. Besides, one of them is new and not yet up to the work. I've given Henderson (the old salesman) the biggest firms on the two lists and Grueby the balance; but neither can take on any appreciable number of the other concerns Clark has indorsed."

"You will have to put on more men," said Junior. "Better get at it quickly, Martin, for Senior is in the mood now to give you anything in reason to help your factory trade. He has seen the list and Clark has told him of the new customers you have got already, and he is anxious to see the thing pushed. Who have you got that you can put on this work?"

New Salesmen Selected.

Martin didn't know of any one. "The only good man on the whole force was Grueby," he said, "and he has already been made a city salesman. There isn't another house salesman who would do at all for outside work."

"There goes a likely chap," said Junior. "Why not give him a trial?"

"Who? Morgan?" asked Mr. Martin. "He never made a sale in his life. He spends a lot of time in getting out orders, though, and knows what we've got and the prices. He might do for the smaller and entirely new trade."

"Have you any more like him?" asked Junior. "It seems to me that a bright man with a knowledge of the goods ought to be easy to train as a salesman. Who runs the cellar stock?"

"Kelly," said Mr. Martin. "He would make good, too, I am sure, among the machine shops and little factories. We have practically no business with them now and Kelly is just the kind of a man to get in with them."

"Who else?" asked Hartman. "Why not give Masters a whirl at it?"

"No! No!" said Martin. "I've got other work for Sam." And he unfolded to Hartman a plan which Hartman and I had discussed and I had suggested to Mr. Martin.

"All right," said Hartman. "That sounds good to me. Aren't there some of the fellows who come in here to buy who would make good salesmen?"

Martin named one or two whom he thought would do, and Junior suggested that he sound them and approach Hartman, Sr., with a request for the additional men. In a few days Mr. Martin had found a really good salesman outside his force, and Hartman, Sr., had authorized him

to put on the additional city salesmen desired, giving him five in all.

Assignment of Territory.

Now came the question of apportionment of the list among the salesmen. Mr. Martin and his five salesmen came back after supper one night and the work was done. The firms visited by Henderson and Grueby were first removed from the list. Then the balance was further reduced by eliminating a number of stores, wholesale houses, hotels and office buildings, whose requirements would be small, and, as Mr. Martin averred, "not worth thinking about." An animated discussion ensued as to the firms and classes of trade to be allotted to each of the three new men. Mr. Martin finally settled the matter by taking a map of Ironville and dividing it into three portions with a ruler. Morgan was given the river front, with the fringe of large factories lying along the railroads which paralleled the river; Kelly drew the central portion, with the lighter manufactories and machine shops, and Williams, the new man, was given the north side, with the steel and iron works and a scattered lot of factories which followed the railroads into the environs. Each of the salesmen was pleased with the arrangement and all went home satisfied.

It had been Mr. Martin's intention to give the different salesmen specific classes of trade, regardless of location, but it was found that the arrangement made upon the spur of the moment as a compromise was a happy one, as each of the men was given a more varied experience and fitted for a wider field.

Division of List.

The next morning Mr. Martin gave me the cards and instructions for their handling. "This bunch," said he, "is Henderson's list, and this is Grueby's. Both stay as they are. This bunch is no good and you might as well throw them away. The balance you will divide according to location, as indicated on this map. And that will end the card business."

"No!" said I to myself. "It only begins it."

(To be continued.)

Pearl Trolling Spoon Bait.

The Clark-Horrocks Company, Utica, N. Y., has recently added to its line of fishing tackle the new Pearl trolling spoon bait. It is referred to as very alluring, and spinning perfectly as the blades are convex shaped. The glint of the pearl attracts game fish, and serves as an effective lure. The spoon is made in five sizes of blades from 1¼ to 2¼ in. long, single, and in two sizes, 1½ and 2 in., double. There is also the Pearl Colorado Spinner for trout, and one that is called the New Dolly Varden Spinner, fancy spotted and striped for big trout.

Steel Shop Chair.

To the line of shop furniture made by the Angle Steel Sled Company, Kalamazoo, Mich., has been added the shop chair here illustrated. It is, with the exception

of the seat, made entirely of steel, and is built to withstand hard service, and at the same time present a good appearance. The frames and legs are of ¾ in. x ½ in. angle steel, with leg braces of flat steel bars ⅝ in. x 3-16 in. and curved back rests of flat steel ⅞ in. x ½ in. firmly secured by rivets. The seat is made of solid wood 1¼ in. thick with dish of ⅝ in., 14 in. in diameter. The chairs are furnished in three sizes, Nos. 10, 20 and 30, with seats, respectively, 18, 20 and 22 in. from the floor, and range in weight from 150 to 170 lb. per dozen. The frame is finished in olive green and the seat is stained and varnished.



Steel Shop Chair.

Chinese Canary Cage and Cage Stand.

O. Lindemann & Co., 35-37 Wooster street, New York, have added to their extensive line of bird cages and allied specialties a series of brass cages in a new design,

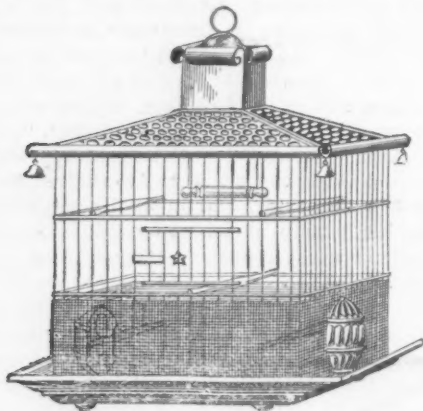


Fig. 1.—Chinese Canary Cage, No. 2373.

sign, styled Chinese because of features resembling Chinese architecture. One of these, No. 2373, shown herewith, is 10¼ x 7¾ in. in size, and is listed with or without the wire guard; also with or without molding bottom and zinc drawer. The

roof of the cage is slanting and is made of perforated sheet brass in four pieces. On top is a sort of cupola, around which the edges of the metal are turned down in a convex curve. Around the eaves of the roof proper the edges turn up in a concave curve and a small bell is hung at each corner. This cage has five perches. A cage of similar but not identical design is offered, which is 9 in. square, has three perches, and also comes with or without wire guard and drawer bottom. The cage stand, Fig. 2, is referred to as an improvement on those formerly made by the firm, which had round bases or square bases, with claw feet. The new stand is 6 ft. 2 in. high, and has ornamental wrought brass legs, forming a tripod with a spread of 20 in., making it steady and unlikely to be upset by accident. The balance of the stand is made of brass tubing. A feature especially emphasized by the manufacturers is the fact that



Fig. 2.—Cage Stand.

the stand may be entirely taken down for shipment, thus effecting a great saving in transportation charges.

The Rowell Railway Car Mover.

The car mover here illustrated is one of new design that is being offered by C. D. Rowell & Son, Appleton,



The Rowell Railway Car Mover.

Wis. Among the several features introduced in the interest of power and efficiency is a compound leverage combined with a patent rocking cam (25), which imparts

a revolving motion to the wheel without exerting a perpendicular lift, tending to raise it from the track. The rocking cam has an important relation to the speed and power developed and is adjustable to either requirement. Thus, when the cam is rocked back toward the handle, as represented in the illustration, it is in position to move the heaviest loaded car; when thrown forward, however, its power capacity is reduced, and the propulsive speed at which it will move light loaded or empty cars is increased almost 50 per cent. The rail grip consists of two steel spurs (23), which are inserted in the under side of the malleable iron shoe (19) in angular alignment, so that they have two sharp contact points upon the face of the rail. The spurs are held in position by a malleable iron clamp (21), which can be readily slipped in and out of place for the removal and turning of the spurs as the edges are dulled by wear. All the parts composing the head of the mover are malleable iron, with the exception of the steel spurs; the lever handle is of wood. This tool, it is claimed, will work under any brake and in all positions under car wheels where it is possible to operate any other mover.

Syracuse Contractors' Barrow.

The Syracuse Chilled Plow Company, Syracuse, N. Y., has added to its line a new contractors' barrow, listed as No. 75A, which is illustrated herewith. It is designed to supply the need for a strong, serviceable, but light weight barrow, and is said to be especially adapted for forward dumping and plank riding. It has a protected wheel and renewable shoes on legs, and is provided with cross bar between legs for plank riding. The company states that the barrow carries the load level and well over the wheel, and has an extra strong strapped tray



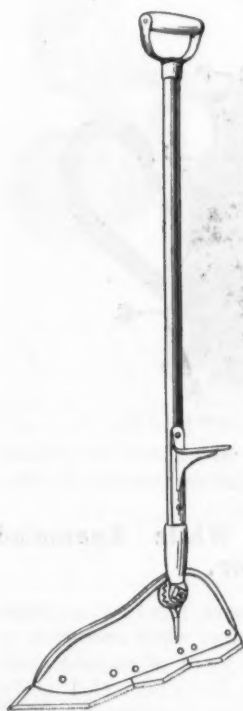
Syracuse Contractors' Barrow.

smooth on the inside and made from a single sheet of 16 gauge annealed steel pressed cold, lapped and riveted at the corners, thus giving extra strength where strength is needed. Spokes and tires are made from special steel of exact carbon, and spokes are cast in the hub, preventing any loosening. Hubs are broad and machine bored. The wheel is 17 in. in diameter, and revolves on a 9-16 bolt or axle clipped in patent iron bearings bolted underneath the handles. Each leg is made by bending a single piece of 1½ x ¾ in. stiff steel in the form of a V with rounded base. The capacity of the barrow is 4 cu. ft., and its weight is 72 lb. The dimensions of the tray are: Length on top, 32½ in.; width on top, 28 in.; depth in front, 10 in.; depth in rear, 7 in.

H. A. STILES & Co., Boston, Mass., manufacturers of the Ottoman brand emery and grinding wheels, have issued a convenient folder calling attention to certain facts

about emery which may not be known by all buyers and users of this product. The subjects treated include quality, shape of grains, packing, &c.

Adjustable Foot Power Hay Knife No. 305.

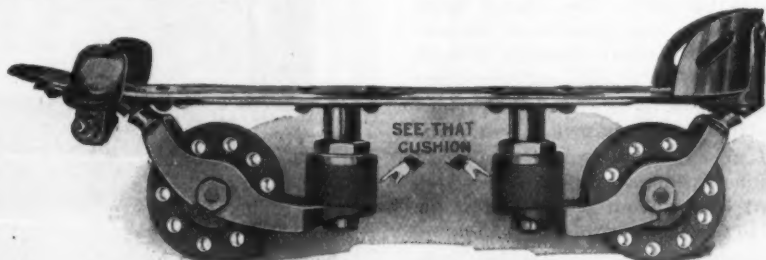


Adjustable Foot Power
Hay Knife.

The hand and foot power hay knife shown herewith comprises, it is claimed, all the advantages of any other hay knife, together with an adjustable back made of the best malleable iron, to which are riveted two scalloped serrated edge sections and one point section made of high grade tool steel, all sharpened and ready for use. The sections are standard and can be replaced at a small cost, thus making a durable tool. The handle is bolted at the ratchet to the blade, and can be easily and quickly adjusted to any angle to suit the operator. The handle is strong, made from best hard maple or ash, well sanded and nicely varnished. The back as well as the step and socket are finished in bright red baked enamel, and the plates are finished in gold bronze to give an attractive appearance. The knives are offered by the G. A. Swineford Company, Canton, Ohio, and are packed one-half dozen in a strong box.

Single Track Sidewalk and Street Skate.

The new roller skate catalogued as the Expert Single Track Ball Bearing Sidewalk and Street Skate, here-



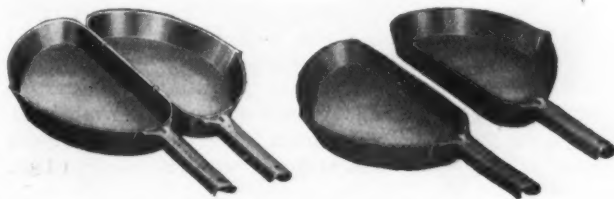
Single Track Sidewalk and Street Skate.

with shown, is being placed on the market by the Richardson Ball Bearing Skate Company, 501 Wells street, Chicago. It is claimed that the same movements can be made upon this two-wheel skate as are possible with high grade four-roller skates. This is due chiefly to the oscillating action permitted by the construction and adjustment of the roller carrier. This particular feature may be observed in the accompanying illustration. One end of the roller carrier rests on a large rubber cushion, while the other is held in a pocket attached to the foot plate. The wheels, which are of cold rolled steel, are 2 in. in diameter, 1 1/4 in. face, with case hardened steel bushings, and their axles are supported in the carrier frame. The skate is designed for flexibility and ease of movement, and at the same time to have the necessary strength and rigidity to provide security and wear. In order to make them low priced enough to meet the popular demand for sidewalk and street skates simplicity of construction was necessary, and as a result the skate is composed of but few and simple parts. The company also manufactures a large line of four-wheel skates for general rink skating.

Hudson's Double or Divided Skillet.

The utensil of which top and bottom views are given in the accompanying illustrations is a fry pan composed of two separable parts and is designed to economize stove space by permitting the cooking of two articles over one

hole or burner at the same time. Each part of the divided skillet, which is made by the Northwestern Consolidated Iron & Steel Mfg. Company, Burlington, Iowa, is of pressed steel and seamless and is fitted with non-heating hollow handles firmly riveted to the body. Each half is 6 x 12 in. in size and of standard depth. The handles are so placed as to maintain an even balance and, being pressed with rounded corners, the inside of the



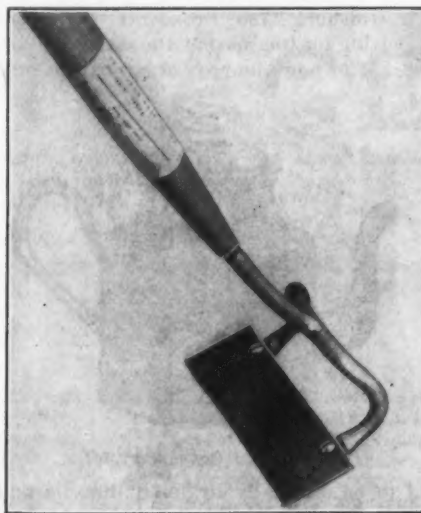
Hudson's Double or Divided Skillet.

vessels is easily cleaned. One section of the skillet has two hooks projecting outward from the top of the inner flange far enough to catch the corresponding side of the other section; by this means both sides can be lifted with one handle when it is convenient to do so. The advantages of the divided form offered in this skillet are obvious enough where it is necessary to cook several different articles at the same time upon a small stove.

The Pierce Removable Garden Hoe.

The new garden hoe here illustrated is made by the Pierce Mfg. Company, Morgan Park, Ill. It is constructed with a detachable steel blade, which is regularly 2 in. wide by 6 in. long, attached to a malleable iron skeleton head frame by brass screws. If blades of greater length are desired for special work they can be substituted by simply removing the screws. This provision also facilitates the sharpening of the hoe blade when grinding is required, thus making it easy to maintain a keen cutting

edge. The hoe, it is claimed, works well in either dry or wet soil, as the surface against which soil and weeds

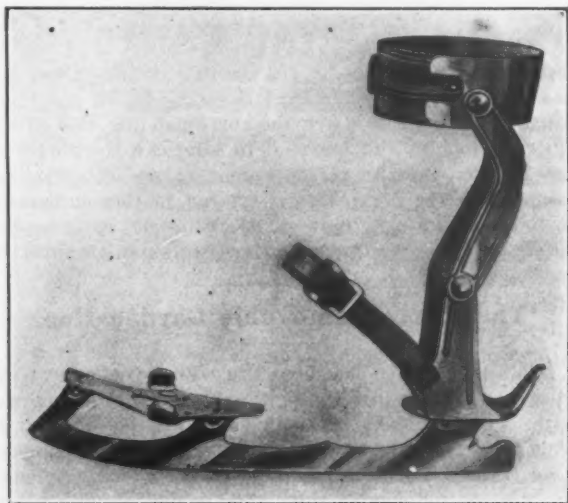


The Pierce Removable Garden Hoe.

might clog is reduced to a minimum. It is adaptable to any sort of service, and to meet varying conditions of work special sized blades are furnished on request.

The 20th Century Skate.

The Kennedy Skate Company, 2 South Franklin street, Chicago, is offering the skate here shown. Perfect rigid support for the ankle, easily adjusted fastenings and a blade curved to provide accurate balance in all positions, are the leading points made by the manufacturer on behalf of the skate. The lower part of the ankle brace is made of steel in one piece with the heel plate, and is attached to the upper cross braced part by rivet hinges. The ankle band, also of steel, is secured to the brace arms in a similar manner, allowing a free flexible forward and backward movement of the ankle while holding it firmly against side strain. The whole brace being made of cold rolled steel, stiffened with ribs, is both light



The 20th Century Skate.

and strong. A notable feature of the skate is that no key is required to fasten it to the shoe. The clamps being adjustable are set to fit the shoe, and pressure of the heel on the slanting heel plate forces the shoe forward, thus effecting a tight wedge fastening in a simple and convenient manner. Easily operated buckles of new design provided for the straps complete the means of attachment. The blades, it is claimed, are curved enough to turn easily, yet are flat enough to give substantial footing on the ice; the curve is more pronounced just in front of the ball of the foot. The skate is made in two styles, C and B, the difference being chiefly in the finish. Both are nicked, style B being the more highly polished.

Ideal Coffee Percolator.

The New England Enameling Company, Middletown, Conn., H. Ginsburg, 736 Broadway, New York, sales agent, is putting on the market the coffee percolator here illustrated. The bowl and spout are made of enameled



Fig. 1.—Ideal Coffee Percolator.

were said to be especially hygienic, durable and easy to keep clean. Handles are electrically welded, no rivets being used. The top is of glass to permit watching the operation of the pump, and the working parts are pure aluminum. All parts can be replaced. In a general way it may be said that the percolator operates on familiar principles, although it has no pump valve. The parts are

shown by the sectional view, Fig. 2, in which A represents the pump, B the tube, C the filtered coffee, D ground coffee in the basket E, and F the glass top. The

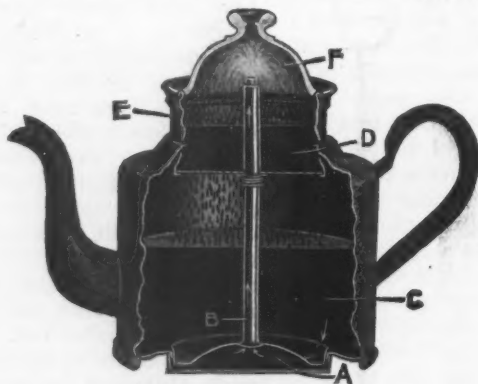


Fig. 2.—Ideal Percolator, Interior View.

device is referred to as economical in that it will furnish a delicious drink with a minimum amount of coffee.

The Gurney All Steel White Enameled Refrigerator.

The Gurney Refrigerator Company, Fond-du-Lac, Wis., is putting on the market the all steel white enameled refrigerator shown herewith. It is made of pressed steel, oak finish on the outside and pure white enameled inside. The dimensions are 47 in. high, 31 in. wide and 21 in. deep, and the ice capacity is 100 lb. Being made alto-



The Gurney All-Steel White Enameled Refrigerator.

gether of steel, it is especially adapted for use in very damp and very dry climates, as it can neither warp nor swell. The refrigerator is packed with mineral wool, and has, it is pointed out, all the good points of the company's regular line. The ice compartments, shelves of the food chamber and drip pipe can be taken out at any time for cleaning. The walls of the ice chamber are galvanized. The refrigerator is also made with a hinged cover on top of the ice chamber, instead of a door as shown in the illustration.

The Rainbow Rink Roller Skate.

The new model roller skate here illustrated is being offered by the Rainbow Amusement Company, 192-200 Washington boulevard, Chicago, Ill., by which it is manufactured. It is especially designed to withstand the

rough usage incident to general rink service and at the same time to secure that degree of lightness necessary to free action and comfort. The foot plates are said to be

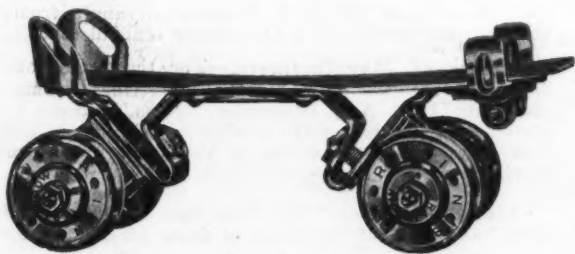


Fig. 1.—The Rainbow Rink Roller Skate.

of exceptional strength, being truss braced by the roller hangers and reinforced to a connecting strip riveted in the under side of the plates which holds the skate in true alignment. Large rubber cushions inserted between the roller carriers and the hangers contribute to the ease of movement and are susceptible of adjustment by means of screws to any desired tension. Either fiber steel or

aluminum rollers are supplied as required, both being fitted with suitable dust caps. The use of pumice stone, chalk or whitening on floors is, it is stated, unnecessary when fiber rollers are employed, and the sanitary conditions of the rink are thus improved by the elimination of unnecessary dust. The rollers are guaranteed by the

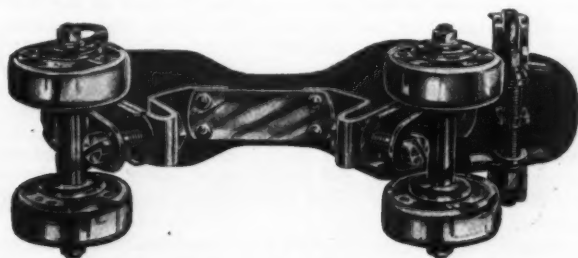


Fig. 2.—Bottom View of Rainbow Rink Roller Skate.

company not to chip, crack or loosen the bushings. The skate can be furnished in any finish and with regular rollers, but for general rink use the three-point bearing steel or fiber rollers are recommended.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	gal.
Linsed, Western, Raw.....	47
State, Raw.....	47
City, Raw.....	48
Boiled, 1¢ gal. advance on Raw.....	49
Raw, Calcutta, in bbls.....	70
Lard, Prime, Winter.....	47
Extra No. 1.....	51
No. 1.....	49
Cotton-seed, Crude, f.o.b. mill.....	30 1/2
Summer Yellow, prime.....	38 1/2
Summer, White.....	41 1/2
Yellow Winter.....	47
Tallow, Acidless.....	58
Menhaden, Brown, Strained.....	34
Northern Crude.....	27
Southern.....	24 1/2
Light Strained.....	34
Bleached Winter.....	36
Ex. Bleached Winter.....	38
Cocanut, Ceylon.....	29
Cochin.....	7 1/2
Cod, Domestic, Prime.....	38
Newfoundland.....	40
Red, Elaine.....	39
Saponified.....	6
Olive, Yellow.....	1 1/2
Neatfoot, Prime.....	55
Palm, Lagos.....	5 1/2

Mineral Oils—

	gal.
Black, 29 gravity, 25¢ cold test.....	13
29 gravity, 15 cold test.....	13 1/2
Summer.....	12 1/2
Cylinder, light filtered.....	20 1/2
Dark, filtered.....	18
Paraffine, 903-907 sp. gravity.....	14 1/2
903 sp. gravity.....	13 1/2
983 sp. gravity.....	11
Red.....	13 1/2

Miscellaneous—

	ton
Barites: White, Foreign.....	18.50
Amer., floated.....	17.00
Off co'r.....	12.50
Chalk, h. bulk.....	3.00

	gal.
China Clay, Imported.....	11.50
Cobalt, Oxide.....	1.45
Whiting, Commercial.....	42
Gilders.....	55
Ex. Gilders.....	60

Putty, Commercial—

	100 lb
In bladders.....	1.70
In bbls, or tubs.....	1.20
In 1 lb to 5 lb cans.....	2.65
In 12 1/2 to 50 lb cans.....	1.50

Spirits Turpentine—

	gal.
In Oil bbls.....	42 1/2
In machine bbls.....	43

Glue—

	100 lb
Cabinet.....	12
Common Bone.....	7 1/2
Extra White.....	18
Fish, liquid, 50 gal. bbls., per gal. on.....	1.20
Foot Stock, White.....	12
Foot Stock, Brown.....	9
German Common Hide.....	10
German Hide.....	12
French.....	10
Irish.....	13
Low Grade.....	10
Medium White.....	14

Gum Shellac—

	21
Bleached, Commercial.....	22
Bone Dry.....	26
Button.....	30
Diamond I.....	30
Fine, Orange.....	30
A. C. Garnet.....	23
G. A. L.....	20
Kala Button.....	15 1/2
P. O.....	34
Octagon B.....	22
T. N.....	22
V. S. O.....	30

Colors in Oil—

	12
Black, Lampblack.....	12
Blue, Chinese.....	36
Blue, Prussian.....	32

	13
Blue, Ultramarine.....	13
Brown, Vandyke.....	11
Green, Chrome.....	12
Green, Paris.....	12
Sienna, Raw.....	12
Sienna, Burnt.....	12
Umber, Raw.....	11
Umber, Burnt.....	11

White and Red, Lead &c.—

	100 lb
Lead, English white, in Oil.....	10 1/2
Lead, American White.....	24 1/2
Dry and in Oil, 100, 250 and 500 lb kegs.....	7
Dry and in Oil, 25 and 50 lb kegs.....	7 1/2
Dry and in Oil, 12 1/2 lb kegs.....	7 1/2
In Oil, 25 lb tin pails.....	7 1/2
In Oil, 12 1/2 lb tin pails.....	8
In Oil, 1, 2, 3 and 5 lb tin cans, ass't.....	9
Red Lead and Litharge.....	7
In 100 lb kegs.....	7
In 25 and 50 lb kegs.....	7 1/2
In 12 1/2 lb kegs.....	7 1/2
In lots of less than 500 lbs, 1/2 lb advance over above prices of White and Red Lead and Litharge.....	
Lead, American, Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.....	

Zinc, Dry—

	5 1/2
American, dry.....	5 1/2
Red Seal (French process).....	6 1/2
Green Seal.....	7 1/2
German Red Seal (French process).....	7
Green Seal.....	7 1/2
White Seal.....	8 1/2
French, Red Seal.....	8 1/2
Green Seal.....	10 1/2

Dry Colors—

	6 1/2
Black Carbon.....	6 1/2
Black Drop, American.....	3 1/2

	5
Black Drop, English.....	5
Black, Ivory.....	16
Lamp, commercial.....	4
Blue, Celestial.....	4
Blue, Chinese.....	30
Blue, Prussian.....	28
Blue, Ultramarine.....	3 1/2
Brown, Spanish.....	3 1/2
Carmine, No. 40.....	33
Green, Chrome, ordinary.....	3 1/2
Green, Chrome, pure.....	17
Ocher, American.....	3
American Golden.....	2 1/2
French.....	1 1/2
Foreign Golden.....	3
Orange Mineral, English.....	10
French.....	12 1/2
German.....	12
American.....	9
Red, Indian, English.....	4 1/2
American.....	3
Red, Turkey, English.....	4
Red, Tuscan, English.....	7
Red, Venetian, Amer.....	100 lb \$0.50
English.....	100 lb \$1.15
Sienna, Italian, Burnt and Powdered.....	3
Italian, Raw, Powdered.....	3
American, Raw.....	1 1/2
American Burnt and Pow'd.....	2
Talc, French.....	100 lb \$18.00
American.....	100 lb \$15.00
Terra Alba, French.....	100 lb \$0.90
English.....	100 lb \$0.90
American.....	100 lb \$0.75
American.....	100 lb \$0.60
Umber, Thy, Bnt. & Pow'd.....	2 1/2
Turkey, Raw and Powdered.....	2 1/2
Burnt, American.....	1 1/2
Raw, American.....	1 1/2
Yellow, Chrome, Pure.....	12 1/2
Vermilion, American Lead.....	3
Quicksilver, bulk.....	65
Quicksilver, bags.....	65
English, Imported.....	70
Chinese.....	90

THE IRON AGE

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ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND CLASS MATTER

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33½ @ 33½ & 10% signifies

that the price of the goods in question ranges from 33½ per cent. discount to 33½ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33½%
North's.....10%
Upson's Patent, ½ gro., \$29.90.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....10%
Ives' Stop Bead Screws and Washers.....10%
Taplin's Perfection.....10%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co., Burton Anti-Rattlers, ½ doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, ½ doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvil.....lb. @ 8¢
Hay-Budden, Wrought.....lb. @ 9¢
Trenton.....lb. @ 9¢

Imported—

Swedish Solid Steel Paragon, ½ lb.....10¢@10½¢
Swedish Solid Steel Sisco, Superior, ½ lb.....10¢@10½¢
Peter Wright & Sons, ½ lb. 84 to 319 lb. 11¢; 350 to 600 lb. 11½¢.

Anvil, Vice and Drill—

Millers Falls Co., \$18.00.....15¢@10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur.....75¢@10¢@80%
Jennings' Patn., Bright, 65¢@10¢@70%
Black Lip or Blued.....65¢@65¢
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40¢@10%
Ford's Auger and Car Bits.....40¢@10%
Ft. Washington Auger Co., Concord's Washington Auger Co., Concord's Pat. Auger Bits.....25%
Forster Pat. Auger Bits.....25%
C. E. Jennings & Co., No. 10 ext. lip, R. Jennings' list.....25¢@7½¢
No. 30, R. Jennings' list.....50%
Russell Jennings.....25¢@10¢@2½¢
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....25%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....60%
Swan's.....65¢@10¢@70%
Swan's, Jennings' Pattern.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, ½ doz., \$26; No. 2, \$18.....60¢@10%
Ford's, Clark's Pattern.....60¢@60¢@10%
C. E. Jennings & Co., Steer's Pat., 25% Lavigne Pat., small size, \$18.00; large size, \$26.00.....60¢@10%
Swan's.....60%

Gimlet Bits—

Common Dbl. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$5.40@6.00
Ames.....20¢@10%
Universal.....20%

Ship Augers and Bits—

Ship Augers.....40¢@10¢@70%
Ford's.....33¢@5%
C. E. Jennings & Co., L'Hommedieu's.....6%
Watrous'.....33½¢@7½¢
Snell's.....48%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awls: Handled.....gro. \$2.75@3.00
Unhanded, Shl'dered.....gro. 63¢@66¢
Unhanded, Patent.....gro. 66¢@70¢

Peg Awls—

Unhanded, Patent.....gro. 31¢@34¢
Unhanded, Shl'dered.....gro. 65¢@70¢
Scratch Awls: Handled, Com.....gro. \$3.50@4.00
Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$1.75@3.50
Second Quality.....\$1.25@4.50
Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle.

Axles—

Concord, Loose Collar.....4¼¢@4½¢
Concord, Solid Collar.....4½¢@5¢
No. 1 Common, Loose.....3¼¢@4¢
No. 1½ Com., New Style.....4¼¢@4½¢
No. 2 Solid Collar.....4¼¢@4½¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18.....70¢@10¢@70¢
Nos. 19 to 22.....70¢@10¢@70¢

Boxes, Axles—

Common and Concord, not turned.....lb., 56¢@6¢
Common and Concord, turned, lb., 60¢@7¢
Half Patent.....lb., 9½¢@10¢

Bait—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20¢@5%

Balances—

Caldwell new list.....50¢@10%
Pullman.....50¢@10%

Spring—

Light Spring Balances.....60¢@60¢@5%
Chatillon's:
Light Spg. Balances.....50¢@50¢@10%
Straight Balances.....40¢@40¢@10%
Circular Balances.....50¢@10%
Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Steel Crowbars, 10 to 40 lb., per lb., 2¼¢@2½¢

Towel—

No. 10 Ideal, Nickel Plate, ½ gro. \$8.50

Beam, Scale—

Scale Beams.....40%
Chatillon's No. 1.....20%
Chatillon's No. 2.....40%
Chatillon's No. 3.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ½ doz. \$0.80; Tinned.....\$0.85
No. 11 Wire Coppered ½ doz. \$1.15; Tinned.....\$1.20
No. 10 Wire Tinned.....½ doz. \$1.50

Beaters Egg—

Dover Stamping & Mfg. Co.:
Genuine Dover, per gro. No. 1, Tumbler Size, \$7.50; No. 2, Family Size, \$7.50; No. 3, Extra Family Size, \$24.00; No. 4, Hotel Size, \$30.00.

Holt-Lyon Co.:
Holt, per doz. No. 5, Jap'd. \$0.80; No. A, Jap'd. \$1.15; No. B, Jap'd. \$1.85; No. 6, Jap'd. \$1.65.
Lyon, Jap'd, per doz., No. 2, \$1.35.

Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd. \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd. \$17.00; No. 200, Tumbler, \$8.50; No. 202, Tumbler Tin'd. \$9.50; No. 300, Mammoth, per doz., \$25.00.

Bellows—

Blacksmith, Standard List:
Split Leather.....60¢@10¢@65%
Grain Leather.....50¢@80¢@10%

Hand—

Inch.....6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—

Wrought Cow Bells.....75%
Jersey.....75¢@10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55¢@10%

Hand—

Polished, Brass.....60¢@10¢@10%
White Metal.....60¢@10¢@10%
Nickel Plated.....50¢@10%
Scales.....50¢@10%
Cone's Globe Hand Bells.....50¢@10%

Miscellaneous—

Farm Bells.....lb., 2¼¢@2½¢
Church and School.....60¢@10¢@10%

Belting—

Leather—
First Quality, Ex. Hy., Strictly Short Lap.....60¢@10%
Standard.....70¢@10¢@70¢
Light Double.....75¢@10%
Cut Leather Lacing.....45¢@50%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Competition (Low Grade).....70¢@10¢@75%
Standard.....60¢@10¢@70%
Best Grades.....40¢@50%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John S. Lang's Son & Co.'s 1908 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—

Common Wooden.....75¢@75¢@5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50¢@10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50¢@10%; Wire Rope Snatch, 50%.

Lane's Patent Automatic Lock and Junior.....30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%
Embossed.....55%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....33½¢@10%

Bolts

Carriage, Machine, &c.—
Common Carriage (cut thread):
¾ x 6 and smaller.....75¢@10%
Larger and longer.....70¢@10%
Common Carriage (rolled thread):
¾ x 6, smaller and shorter, 75¢@10%
¾ x 10, 75¢@10%
¾ x 12, 75¢@10%
¾ x 14, 75¢@10%
¾ x 16, 75¢@10%
¾ x 18, 75¢@10%
¾ x 20, 75¢@10%
¾ x 22, 75¢@10%
¾ x 24, 75¢@10%
¾ x 26, 75¢@10%
¾ x 28, 75¢@10%
¾ x 30, 75¢@10%
¾ x 32, 75¢@10%
¾ x 34, 75¢@10%
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¾ x 80, 75¢@10%
¾ x 82, 75¢@10%
¾ x 84, 75¢@10%
¾ x 86, 75¢@10%
¾ x 88, 75¢@10%
¾ x 90, 75¢@10%
¾ x 92, 75¢@10%
¾ x 94, 75¢@10%
¾ x 96, 75¢@10%
¾ x 98, 75¢@10%
¾ x 100, 75¢@10%

Phila. Eagle, \$3.00 list.....50¢@—
Bolt Ends, with C. & T. Nuts, 70¢@10%

Machine (Cut Thread):

¾ x 4 and smaller.....75¢@10%
Larger and longer.....70¢@10%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knobs:
Inch.....3 4 5 6 8
Per doz. \$0.30 .35 .45 .60 .80

Cast Iron Spring Foot, Jap'd:
Inch.....6 8 10
Per doz. \$1.20 1.50 2.25

Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz. \$1.00 1.40 1.65

Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch.....6 8 10
Per doz. \$0.75 .95 1.25

Wrought Barrel Japanned:
80¢@10¢@80¢@10¢@5%

Barrel Bronzed.....60¢@10%
Spring.....70¢@10¢@70¢@10%
Shutter.....50¢@50¢@10¢@5%

Square Neck.....75¢@75¢@10%
Square.....70¢@10¢@10¢@10%
Ives' Mortise.....10%
Ives' Wrought Metal.....10%

Expansion—

F. H. Evans' Crescent.....40¢@80%
Richards Mfg. Co.....55¢@10%
Star Expansion Bolt Co.:
Star Lag Screw Type.....60¢@10¢@5¢@24¢
Star Wood Screw Type.....40%
Star Machine, Single Wedge.....60%

Star Machine, Double Wedge.....60%
Steward & Romain Mfg. Co.:
Style No. 13, Double.....60%
Style No. 1, Single.....60%
Style No. 100, Dbl. Jaw, Single.....55%
Lag Screw.....66%

Plow and Stove—
Plow.....65¢@5¢@70%
Stove.....85¢@85¢@5%

Tire—
Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila. list Oct. 16, '94.....80%
Eagle Phila. list Oct. 16, '94.....82%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila. list Oct. 16, '94.....80%
Eagle Phila. list Oct. 16, '94.....82%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. 16, '94.....80%
Eagle.....82%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1881.....82%
Upson Nut Co.:
Tire Bolts.....72%
Tire Bolts.....72%

Borers, Bung—
Borers Bung, Ring, with Handle:
Inch.....1¼ 1½ 1¾ 2
Per doz. \$4.80 5.60 6.40 8.00
Inch.....2¼ 2½ 2¾ 3
Per doz. \$8.65 11.50

Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved.....20¢@10%
Acme.....15¢@10%
Perfection.....40%
Seavey.....45%

Braces—
Common Ball, American.....\$1.50
Barber's.....50¢@10¢@10¢@10%
Fray's Genuine Spoford's.....60%
Fray's No. 61, 100, 206, 614.....50%
C. E. Jennings & Co.....50¢@
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat.....50%
Millers Falls Drill Braces.....25¢@10%
P. S. & W. Co., Peck's Pat.....60¢@10%

Brackets—
Wrought Steel.....75¢@10¢@80%
Bradley Metal Clasp.....80¢@10¢@10¢@10%
Griffin's Pressed Steel.....75¢@10¢@10%
Griffin's Folding Brackets.....70¢@10%
Taplin Victor Handy Egg Beater Bracket.....9 doz. \$1.50

Bright Wire Goods—
See Wire and Wire Goods.

Boilers—
Kilbourne Mfg. Co.....75¢@20%
Wire Goods Co.....75%

Buckets, Galvanized—
Mfr's list, price per gross:
Quart. 10 12 14
Water, Reg.....26.85 29.50 33.50
Water, Hvy.....45.35 48.00 52.00
Fire, Rd. Btm.....32.00 34.65 38.65
Well.....37.35 41.35 45.35

Bull Rings—See Rings, Bull

Butts—
Wrought, High List, Oct. 26, '06.....65%
Cast Brass, Tiebout's.....40¢@10%

Cast Iron—
Fast Joint, Broad.....40¢@10¢@50%
Fast Joint, Narrow.....40¢@10¢@50%
Loose Joint.....70¢@10¢@75%
Loose Pin.....70¢@10¢@75%
Mayer's Hinges.....70¢@70¢
Parliament Butts.....70¢@70¢

Wrought Steel—
Bright:
Light Narrow, Light Reversible.....70¢@5%
Reversible and Broad.....70¢@5%
Loose Joint, Narrow, Light Inside Blind, &c.....70%
Back Flaps, Table Chest.....65%
Japanned:
Light Narrow, Loose Pin.....40¢@5%
Light Narrow, Ball Tip.....60%
Broad.....40¢@5%
Steeple Tipped.....70%
Ball Tipped.....70%

Cages, Bird—

Hendryx Brass: Series 3000, 5000,
1100, net list; 1200, 15%; 200,
300.....30%
Hendryx Bronze: Series 700, 800.....30%
Hendryx Enameled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per 100 lb.,
\$3.50 @ \$3.85
Sharp, 1 prong, per 100 lb.,
\$4.00 @ \$4.35
Burke's, 1 pg. Blunt Toe, 3/4 c; 2 pg.
Blunt Toe, 4/4 c; 1 pg. Sharp Toe,
4/4 c; 2 pg. Sharp, 4/4 c; Blunt
Heel, 4/4 c; Sharp Heel, 4/4 c;
Lautier, Blunt, 4/4 c; Sharp, 4/4 c;
Lautier, Blunt, 1/2 lb, 3.55 c; Sharp,
4.15 c

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B.....52 @ 55¢
G. D.....per M 40¢ @ 45¢
F. L.....per M 40¢ @ 45¢
G. E.....per M 48¢ @ 50¢
Musket.....per M 62¢ @ 65¢

Primers—

Berdan Primers, \$2 per M.....20¢
Primer Shells and Bullets, 15¢ @ 10¢
All other primers per M \$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢ @ 5%
38 C. F., \$7.00.....10¢ @ 5%
22 cal. Rim, \$1.50.....10¢ @ 5%
32 cal. Rim, \$2.75.....10¢ @ 5%
B. B. Caps, Con. Ball, Suedg \$1.00
B. B. Caps, Round Ball.....\$1.40
Central Fire.....25¢
Target and Sporting Rifle, 15¢ @ 10¢
Primed Shells and Bullets, 15¢ @ 10¢
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢ @ 5%

Casters—

Bed.....65¢ @ 70¢
Plate.....60¢ @ 65¢
Philadelphia.....70¢ @ 75¢
Acme, Ball Bearing.....35¢
Gem (Roller Bearing).....70¢ @ 10¢ @ 5%
Steel Gem (Roller Bearing).....70¢
Standard Ball Bearing.....45¢
Yale (Double Wheel) low list.....40¢ @ 10%

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3-16 1/4 5-16 3/8 1/2 5/8
\$7.70 5.10 4.15 3.50 3.30 3.10
3/4 1/2 1 1/4 to 1 1/2 inch.
\$3.00 3.10
In cash lots, deduct 25¢.

German Coll.....70%
German Pattern Coll:
6-0 to 1.....70¢ @ 10¢ @ 5%
2 and 3.....60¢ @ 10¢ @ 5%
4, 5 and 6.....50¢ @ 10¢ @ 5%
Halter—

Halter Chains.....60¢ @ 10¢ @ 5%
German Pattern Halter Chains:
list July 2, '07.....60¢ @ 10¢ @ 5%
Covert Mfg. Co.,
Halter.....35¢ @ 5%

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/4-6-3, Straight, with ring, \$28.00
6 1/4-6-2, Straight, with ring, \$29.00
6 1/4-6-2, Straight, with ring, \$32.00
6 1/4-10-2, Straight, with ring, \$37.00
NOTE.—Add 2c per pair for Hooks
Twist Traces: add per pair for Nos. 2
and 3, 2c; No. 1, 3c; No. 0, 4c to price of
Straight Link.
Eastern Standard Traces, Wag-
on Chain, &c.....60¢ @ 10¢ @ 5%

Miscellaneous—

Jack Chain, list July 10, '03:
Iron.....60¢ @ 10¢ @ 5%
Brass.....65¢
Safety and Plumbers' Chain, 75¢
Gal. Pump Chain.....1/2, 4/4 @ 5%
Bridgeport Chain Co.:
Triumph Halter and Coll, 35¢ @ 24¢ @ 10%
Triumph Dog.....50¢ @ 10¢ @ 5%
Brown Halter and Coll.....45¢ @ 5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40%
Onaida Community:
American Halter, Dog and Kennel
Chains.....35¢ @ 24¢ @ 10%
Niagara Dog Leads and Kennel
Chains.....45¢ @ 5%
Wire Goods Co.:
Dog Chain.....70%
Universal Dbl. Jointed Chain.....70%
Chain and Ribbon, Sash—
Onaida Community:
Steel Chain.....80%
Pullman:
Bronze Chain, 60%; Steel Chain,
Coppered.....80¢ @ 10%
Sash Chain Attachments, per set, 8¢
Aluminum Sash Ribbon, per 100
ft.....\$2.00 @ \$5.00
Sash Ribbon Attachments, per set, 8¢

Chalk—

Carpenters' Blue.....gro., 50¢
Carpenters' Red.....gro., 50¢
Carpenters' White.....gro., 40¢
Checks, Door—
Bardsley's.....45%
Pullman, per gro.....\$54.00
Russwin.....35%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests with Tools.....55%
Youths' Chests with Tools.....40%
Gentlemen's Chests with Tools.....30%
Farmers', Carpenters', etc., Chests,
with Tools.....20%
Machinists' and Pipe Fitters'
Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists'
Tool Chests.....75%

Chisels—

Socket Framing and Firmer
Standard List.....80¢ @ 10¢ @ 5%
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25¢ @ 75%
Socket Framing No. 15.....25¢ @ 75%
Swan's.....66¢ @ 70%
L. & I. J. White & Co.....30¢ @ 30¢ @ 5%

Tanged—

Tanged Firmers.....30¢ @ 35%
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181, 25
L. & I. J. White Co.....25¢ @ 5%

Cold—

Cold Chisels, good quality, 13¢ @ 15¢
Cold Chisels, fair quality, 11¢ @ 12¢
Cold Chisels, ordinary.....9¢ @ 10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....35%
Beach Pat, each \$8.00.....35¢ @ 5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Lathe Chucks:
Independent.....35%
Universal, Reversible Jaws.....35%
Universal, Com. Style Jaws.....35%
Combination, Reversible Jaws.....35%
Combination, Com. Style Jaws.....40%
Round Body or Box Body, 2 Chuck
Jaws.....25%
Geared Scroll Chucks.....25%
Drill Chucks:
New Model, 25%; Geared Pat-
tern, 25%; Skinner Patent, 25%
Positive Drive.....40%
Planer Chucks.....20%
Standard.....45%
Drill Press Vises.....30%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35%
Scroll Combinations, Nos. 83 and
30.....35%
Geared Scroll, Nos. 33, 34 and 35.....25%
Independent Iron, Nos. 18 and 318, 35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104.....35%
Union Car Drill.....25%
Universal, 11, 12, 16, 17, 13, 14, 15, 40%
Universal No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30,
48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and
72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Onaida Drill.....50%
Scroll Combination Lathe.....50%
Whitaker Mfg. Co.:
National Drill.....25%

Clamps—

Carriage Makers', Star, P., S. & W.
Co.....50%
Besly, Parallel.....35¢ @ 10%
Hammer & Co.:
Adjustable.....20¢ @ 5%
Carriage Makers' H. P. Screw, 40¢ @ 5%
Myers' Hay Rack.....50%
Lineman's Swedish Neverturn.....45%
Saw Clamps, see Vises, Saw Fliers

Cleaners, Drain—

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

American Fork & Hoe Co.:
Star, 1/2 doz., Socket, \$4.00;
Shank, 1/2 doz., X 7/8, \$3.50; Shank,
X 8.....\$3.75

Cleavers, Butchers—

Poster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each.....\$10.75
20th Century Horse, each.....\$5.00
Lightning Belt Horse, each.....\$15.00
Chicago Belt Horse, each.....\$20.00
Stewart's Enclosed Gear Roll
Bearing Horse, each.....\$6.75
Stewart's New Model Sheep
Shearing Machine, each.....\$12.75
Stewart's Enclosed Gear Shear-
ing Machine, No. 8, each.....\$9.75

Clips, Axle—

Regular Styles, list July 1, '05,
80¢ @ 80¢ @ 10%

Cloth and Netting, wire

—See Wire, &c.

Cocks, Brass—

Hardware Hat:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....75%
Compression Bibbs.....70%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Son's list.....40%
Leather, Walter B. Stevens & Son's
list.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70¢ @ 10¢ @ 75%

Conductor Pipe—

L. C. L. to Dealers:
Gal. Steel, Charcoal, Copper.

Northeastern:
70¢ @ 10% 50¢ @ 10¢ 7 1/2% 50¢ @ 10%

Eastern:
70¢ @ 10% 50¢ @ 10¢ 7 1/2% 50¢ @ 10%

Central:
75¢ @ 5% 60% 50¢ @ 10%

Northwestern:
75¢ @ 2 1/2% 60% 50¢ @ 10%

Western:
70¢ @ 7 1/2% 50¢ @ 12 1/2% 50¢ @ 5%

Tennessee:
70¢ @ 10% 50¢ @ 12 1/2% 50¢ @ 10%

Southern:
70% 50¢ @ 12 1/2% 50¢ @ 5%

Southwestern:
70% 50¢ @ 5% 50¢ @ 5%

Terms, 60 days: 2% cash 10 days. Fac-
tory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:
Gal.....2 3 4 6 8
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.90
Galvanized, Lined, side handles,
ea. \$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enameled.....10%
Agate Lined.....10%

Coppers' Tools—

See Tools, Coopers'.

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair
and heavier, 2 1/4¢; lighter
than 3 lb. to pair.....23 1/4¢

Cord—

Braided, Drab.....lb. 35¢
Braided, White, Com. Nos. 8
to 12, 2 1/2¢; No. 7, 2 1/4¢; No. 6,
2 1/2¢. In lots of 12 doz. or
over, 1 cent less per pound.

Cable Laid Italian, lb., No. 18, 57¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11¢ @ 1 1/2¢
Cotton Sash Cord, Tied, 18¢ @ 20¢
Patent Russia.....lb., 20¢
Cable Laid Russia.....lb., 21¢
India Hemp, Br'd'd.....lb., 21¢
India Hemp, Twisted.....lb., 13¢ @ 1 1/2¢
Patent India, Twisted.....lb., 17¢
Pearl Braided, cotton, No. 6, 3 lb.
20¢; No. 7, 19¢; No. 8 to 12,
19 1/2¢. In 12 doz. to 100 doz. lots,
Eddystone, Braided, Nos. 8 to 12,
26¢; 7, 26¢; 6, 27 1/2¢.
Harmony Cable Laid Italian, Nos. 7
to 10, lb. 23¢

Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100, \$2.00
Samson, Nos. 8 to 12:
Braided, 1/2 lb. Drab Cotton,
55¢; Italian Hemp, 40¢ @
50¢; Linen, 65¢; White Cot-
ton, 50¢; Spot Cord.....50¢
Massachusetts, White, 3 lb. 45¢
Massachusetts, Drab, 3 lb. 45¢
Phoenix, White, Nos. 8 to 12.....27¢
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢;
B, Drab, 40¢; B, White, 35¢;
Italian Hemp, 40¢; Linen.....57 1/2¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90¢ @ 2¢
Short Length.....90¢ @ 20¢ @ 7¢
Hendryx Standard Wire Picture Cord,
old list, 85¢ @ 10%

Turner & Stanton Co. Wire Picture
Cord.....90%

Cradles—

Grain.....50%

Crayons—

White Round Crayons, Cases, 100
gro., \$8.00, \$8.50, \$9.00 and \$10.00
according to grade.

Zelnicke's Lumber: 1/2 gro.
White and Purple, Indelible.....\$7.50
Blue, Red, Green, Yellow and
Terra Cotta, \$6.50; Black.....\$4.50
round, all colors, \$12.00; Indeli-
bles, \$14.00; Blacks.....\$10.00
Genuine Soapstone, Metal Workers',
5 in. x 1/4 in. Round, \$2.50; 5 in. x
1/4 in. Square, \$1.75; 5 x 1/4 x 3-16,
\$2.50; 5 x 1/4 x 3-16.....\$3.00
Suremark, Black, \$2.25; Blue, Red
and Yellow.....\$2.50

Crooks, Shepherds—

American Fork & Hoe Co.:
Montana.....1/2 doz. \$4.50

Crow Bars—

See Bars, Crow.

Cultivators—

American Fork & Hoe Co.:
Victor Garden.....50¢ @ 10%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, 1/2 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....1/2 doz. \$3.00
Wm. Rogers & Son.....1/2 doz. \$2.50

Cutters—

Glass—
H. H. Mayhew Co.....40%
Red Devil.....60%
F. Mfg. Co.....40%
Woodward.....50%

Meat and Food—

American.....30%
Nos. 401 402 403 404 405 406 407
Each.....\$5 \$7 \$10 \$12 \$25 \$50 \$60
Enterprise:
Nos. 5 10 12 22 32
Each.....\$2 \$3 \$2.75 \$4.50 \$6 25¢ @ 7 1/2%
No. 202, \$1.50.....40¢ @ 7 1/2%
P. S. & W. Co.:
Ideal.....40¢ @ 10¢ @ 5%

Hales.....60¢ @ 5%
Little Giant.....1/2 doz. 40¢ @ 50%
Nos. 305 310 312 320 331 332
\$35.00 \$40.00 \$44.00 \$72.00 \$68.00
New Triumph No. 605, 1/2 doz. \$24.00,
40%

Russwin Food, No. 1, \$24.00; No. 2,
\$27.00; 3, \$42.00.....45¢ @ 10¢
\$15.00 \$18.00

Enterprise Beef Shavers.....25¢ @ 30%

Siaw and Kraut—

Henry Disston & Sons:
Siaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Siaw Cutters, 1 Knife.....1/2 doz. \$3.00
Combined Siaw Cutter and Corn
Grater.....1/2 doz. \$4.00

Tobacco—

All Iron, Cheap.....doz., \$4.25 @ 1.50
Enterprise.....25¢ @ 30%
National, 1/2 doz., No. 1, \$3; No. 2,
\$18.....40%

Diggers, Post Hole, &c—

Disston's:
Rapid, 1/2 doz., \$24.00.....25%
Samson, 1/2 doz., \$34.00.....25%
Iwan's Pat. Post Hole and Well
Auger.....40%
Vaughan Pattern Post Hole Augers,
1/2 doz., \$7.00
Perfection Post Hole Diggers, 1/2
doz., \$8.50
Split Handle Post Hole Diggers,
1/2 doz., \$7.50
Hercules Pattern, 1/2 doz., \$11.00
Kohler's, 1/2 doz., Universal, \$14.00
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.50; Pioneer.....\$7.50
Never-Break Crucible Steel Post
Hole Diggers.....60%

Dividers—See Compasses.

Drawing Knives—

See Knives, Drawing.

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling
Machines.....\$1.50 @ 1.75
Brest, Millers Falls.....15¢ @ 10%
Brest, P. S. & W.....35%
C. & C. Ratchet.....25%
Reversible Ratchet Die Stocks.....25%
Goodell Automatic Drills 50A, 10¢ @ 60¢ @ 10%
Millers Falls Automatic Drills,
Graves', per doz., Nos. 1, \$4.86;
2, \$8.16
Millers Falls Automatic Drills, 33 1/2¢ @ 10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Im-
proved.....40¢ @ 40¢ @ 5%
Ratchet, No. 012.....40¢ @ 40¢ @ 5%
Ratchet, Celebrated.....40¢ @ 40¢ @ 5%
Ratchet, Whitney's, P. S. & W.....40¢ @ 100%
Whitney's Adjustable, No. 10, \$12.00,
33 1/2%

Twist Drills—

Bit Stock.....70¢ @ 70¢ @ 5%
Taper and Straight Shank,
60¢ @ 10¢ @ 70%

Drivers, Screw—

Screw Driver Bits, per doz. \$5 @ 50¢
Balsey's Screw Holder and Driver, 1/2
doz., 2 1/2-in. \$6; 4-in., \$7.50; 6-in.,
\$9

Buck Bros' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Fray's Hol. H'dle Sets, No. 3, \$12.50
Ford's Brace Screw Drivers.....40¢ @ 10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65¢ @ 65¢ @ 10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, 1/2 doz., Nos. 11, \$9.95;
12, \$15.75; 20, \$8.17; 21, \$8.46; 41,
\$15.45; 42, \$17.21
Smith & Hemenway Co. Never-
turn, 66%; Elmora, 60%; Star,
30¢ @ 10%

Swan's:
Nos. 7565 to 7568, 60%; No. 7540,
40¢ @ 10%

Eave Trough, Galvanized—

Territory. Gal. Steel. Copper.
Northeastern.....75¢ @ 10¢ @ 5%
Eastern.....80%
Central.....80¢ @ 10%
Northwestern.....80¢ @ 10¢ @ 5%
Western.....80¢ @ 5%
Tennessee.....80¢ @ 5%
Southern.....75¢ @ 10%
Southwestern.....75¢ @ 10¢ @ 2 1/2% 50¢ @ 5%

Terms.—2% for cash. Factory shipments
generally delivered.

Note.—Lower prices are made in some
sections.

See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel, Galv. C. I. and
Copper.

Sizes 2, 3, 4.....80%
Sizes 1 1/2, 2 1/2, 3 1/2, 5, 6.....60¢ @ 10%
No. 26.....50%
No. 24.....85%
Copper Elbows.....50%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40¢ @ 10¢ @ 10%
Edwards, Royal Blue.....40¢ @ 10¢ @ 10%
Reeves, Dover, Flat Crimp, 40¢ @ 10¢ @ 5%

Emery, Turkish—

4 to 54 to
46: \$80; Flour.
Kegs.....lb. 5¢
1/2 Kegs.....lb. 5¢
1/4 Kegs.....lb. 5¢

Hoes— Eye
Scott's Oval Pattern, 60¢ 10¢ 60¢ 10¢ 10¢
Grub, list Feb. 23, 1899, 70¢ 10¢ 70¢ 10¢ 10¢
 D. & H. Scovill, 70¢ 10¢ 70¢ 10¢ 10¢
 Am. Fork & Hoe Co. (Scovill Pat-
 tern) 60¢ 5¢

Handled—
 Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
 Star Double Bit, \$2.50
 American Fork & Hoe Co.:
 Regular, Cotton, 75¢ 10¢ 5¢ 2½¢
 Crescent, Cultivator, 75¢ 10¢ 5¢
 Mattock, Senior, 70¢
 Mattock, Junior, 50¢
 Sprouting, 50¢
 Tobacco, Harper's, 66¢ 15¢ 10¢ 5¢
 Warren, 55¢ 10¢ 10¢ 5¢
 Ivanhoe, 65¢ 15¢ 10¢ 5¢
 Cultivator, B B 6, 70¢ 10¢ 10¢ 5¢
 Cultivator, B B 6, 70¢ 10¢ 10¢ 5¢
 Weeding, Acme, 72¢ 10¢ 10¢ 5¢
 Seuffle, Lightning, 60¢ 5¢

Hoisting Apparatus—
 See *Machines, Hoisting*.

Holders— Bit—
 Angular, ½ doz., \$21.00, 45¢ 10¢

Door—
 Bardsley's, Iron, 40%; Brass and
 Bronze, 25¢
 Empire, 50¢
 Pullman, 50¢
 Richards, 40%; No. 118, 119, Sure
 Grip, 50¢
 Superior, 33½¢

File and Tool—
 Nicholson File Holders and File
 Handles, 33½¢ 40¢

Fruit Jar—
 Triumph Fruit Jar Holder, ½ gross,
 \$18.00; ½ doz., \$2.00

Trace and Rein—
 Fernald Double Trace Holder, ½ doz.,
 pairs, \$1.25
 Dash Rein Holder, ½ doz., \$1.25

Hones—Razor—
 Pike Mfg. Co., Belgian and Swat,
 50%; German, 33½¢

Hooks—Cast Iron—
 Bird Cage, Reading, 40¢
 Clothes Line, Reading List, 40¢
 Coat and Hat, Reading, 45¢ 20¢
 Coat and Hat, Wrightsville, 60¢ 45¢
 Harness, Reading List, 40¢

Wire—
 Belt, Nos. 1 to 15, 75¢ 10¢ 90¢
 Wire O. & H. Hooks, 80¢ 80¢ 10¢
 Bradley Metal Clasp Wire, Coat and
 Hat, 75¢ 10¢ 80¢; Ceiling, 75¢ 10¢ 80¢
 Columbian Hdw. Co., Gem, 75¢ 10¢
 Parker Wire Goods Co., King, 75¢ 10¢
 Wire Goods Co.:
 Acme, 60¢ 10¢; Chief, 70¢ 10¢
 Crown, 75¢; Czar, 65¢ 10¢; V
 Brace, 75¢; Czar Harness, 50¢;
 Ceiling, 75¢

Wrought Iron—
 Box, 6 in., per doz., \$0.90; 8 in.,
 \$1.15

Cotton—
 Wrought Staples, Hooks, etc.,
 See *Wrought Goods*.

Miscellaneous—
 Hooks, Bench, see *Stops, Bench*.
 Bush, Light, doz., \$6.20; Medium,
 \$6.75; Heavy, \$7.65
 Grass, best, all sizes, per doz.,
 \$2.75 43¢ 30¢
 Grass, common grades, all sizes,
 per doz., \$1.25 43¢ 30¢
 Whiffletree, 10¢ 5¢ 46¢
Hooks and Eyes:
 Brass, 60¢ 60¢ 10¢
 Malleable Iron, 70¢ 70¢ 10¢
 Covert Mfg. Co. Gate and Scuttle
 Hooks, 40¢
 Turner & Stanton Co. Cup and
 Shoulder, 85¢ 10¢
 Bench Hooks—See *Bench Stops*.
 Corn Hooks—See *Knives, Corn*.

Horse Nails—
 See *Nails, Horse*.

Horseshoes—
 See *Shoes, Horses*.

Hose, Rubber—
 Garden Hose, ¾-inch:
 Competition, 1 ft., 6¢ 4¢ 4¢
 3-ply Guaranteed, 1 ft., 8¢ 4¢ 4¢
 4-ply Guaranteed, 1 ft., 9¢ 4¢ 4¢
 Cotton Garden, ¾-in., coupled:
 Low Grade, 1 ft., 8¢ 9¢
 Fair Quality, 1 ft., 10¢ 11¢

Irons— Sad—
 From 4 to 10, 10¢ 2½¢ 2½¢
 B. B. Sad Irons, 10¢ 3½¢ 3½¢
 Mrs. Potts', cents per set:
 Nos. 50, 55, 60, 65
 Jap'd Caps., 86 93 96 93
 Tin'd Caps., 91 98 1.01 98
 New England Pressing, 10¢ 3½¢ 4¢

Bar and Corner—
 Richards Mfg. Co., Bar, 60¢ 10¢
 Corner, 60¢

Pinking—
 Pinking Irons, 60¢ 60¢ 4¢

Irons, Soldering—
 See *Coppers*.

Jacks, Wagons—
 Covert Mfg. Co.:
 Auto Screw, 30¢ 22¢; Steel, 45¢
 Lockport, 50¢
 Lane's Steel, 30¢ 45¢
 Richards' Tiger Steel, No. 130, 50¢ 10¢
 Smith & Hemenway Co.'s, 25¢

Ladder—
 Richards Mfg. Co., Ladder Jacks, 50¢

Jointers—
 Pike Mfg. Co., Saw Jointers, \$7.00, 40%

Kettles—
 Brass, Spun, Plain, 20¢ 25¢
 Enamelled and Cast Iron—See *Ware*,
 Hollow.

Knives—
Butcher, Kitchen, &c.—
 Foster Bros.' Butcher, &c., 30¢
 Wilkinson Shear & Cutlery Co., 60%

Corn—
 Columbian Cutlery Co., Wilcut
 Brand Knives and Hooks, 60%
 American Fork & Hoe Co.:
 Easy Cut, ½ doz., No. 10 C H., \$2.10
 Easy Cut, ½ doz., No. 10 B C H., \$2.20
 Acme, ½ doz., \$2.35
 Dent, ½ doz., \$2.35
 Adjustable, Serrated, ½ doz., \$1.90
 Serrated, ½ doz., \$1.85
 Yankee, No. 1 C H., \$1.35
 Yankee, No. 2 C H., \$1.15

Drawing—
 Standard List, 80¢ 10¢ 4¢
 C. E. Jennings & Co., Nos. 45, 46,
 25¢ 7½¢

Jennings & Griffin, Nos. 41, 42,
 66¢ 7½¢
 Swan's, 66¢ 7½¢
 Watrous, 16¢
 L. & I. J. White, 20¢ 5¢ 25¢

Hay and Straw—
 Serrated Edge, per doz., \$5.00 45¢ 50¢
 Iwan's Sickle Edge, ½ doz., \$2.50
 Iwan's Serrated, ½ doz., \$10.00

Miscellaneous—
 Farriers', ½ doz., \$2.60 43¢ 35¢
 Wostenholm's, ½ doz., \$3.00 43¢ 35¢

Knobs—
 Base, 2½-inch, Birch or Maple,
 Rubber Tap, 1 doz., \$1.25 41¢ 40¢
 Carriage, Jap., Drive, all sizes,
 35¢ 40¢ 40¢

Door, Mineral—
 Door, Por. Jap'd, 1 doz., 70¢ 75¢
 Door, Por. Nickel, 1 doz., \$2.05 42¢ 15¢
 Bardsley's Wood Door, Shutters, &c., 15%

Lacing, Leather—
 See *Belting, Leather*

Ladders, Store, &c.—
 Lane's Store, 25¢
 Myers' Noiseless Store Ladders, 50%
 Richards Mfg. Co.:
 Improved Noiseless, No. 112, 50%
 Climax Shelf, No. 113, 50%
 Trolley, No. 109, 50%

Ladles, Melting—
 L. & G. Mfg. Co., Melting and
 Plumber, 25¢
 P. S. & W., 40¢ 10¢
 Reading, 60%

Lamps,—
 Hammer's M. I. Hand, 45%

Lanterns—Tubular—
 Regular, No. 0, 1 doz., \$4.35 43¢ 45¢
 Side Lift, No. 0, 1 doz., \$4.60 43¢ 45¢
 Hinge Globe, No. 0, 1 doz., \$4.60 43¢ 45¢
 Other Styles, 40¢ 40¢ 10¢

Bull's Eye Police—
 3-inch, 1 doz., \$3.75 43¢ 40¢

Latches— Thumb—
 Roggin's Latches, Jap'd, with
 Screws, 1 doz., 35¢ 40¢

Door—
 Cronk & Carrier Mfg. Co., No. 101,
 ½ doz., \$2.00
 Richards' Bull Dog, Heavy, No. 125,
 50¢ 45¢
 Richards' Trump, No. 127, 45¢ 50¢

Leaders, Cattle—
 Small, 1 doz., 50¢; large, 60¢
 Covert Mfg. Co.:
 Cotton, 45%; Hemp, 45%; Jute,
 35%; Sisal, 20%.

Leathers, Pump—
 See *Pumps*.

Lifters, Transom—
 R. & E., 10%

Lines—
 Wire Clothes, Nos. 18, 19, 20
 100 feet, \$2.30 1.95 1.75
 75 feet, \$1.95 1.65 1.50

Samsom Cordage Works:
 Solid Braided Chalk, Nos. 0 to 3, 40%
 Solid Braided Masons', 30%
 Silver Lake Braided Chalk, No. 0,
 \$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
 3, \$7.50.
 Masons' Lines, Shade Cord, &c.:
 White Cotton, No. 3½, \$1.50; No. 4,
 \$2.00; No. 4½, \$2.50; Colors, No. 3½,
 \$1.75; No. 4, \$2.25; No. 4½, \$2.75;
 Linen, No. 3½, \$2.50; No. 4, \$3.50;
 No. 4½, \$4.50.
 Tent and Awning Lines: No. 5,
 White Cotton, \$7.50; Drab Cotton,
 \$8.50.
 Clothes Lines, White Cotton: 50 ft.,
 \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
 100 ft., \$5.25.
 Turner & Stanton Co.:
 Solid Braided Chalk, Masons' and
 Awning Lines, 40%
 Clothes Lines, White Cotton, 20%
 Shade Cord, Cotton or Linen, 20%

Locks— Cabinet—
 Cabinet Locks, 33½¢ 33½¢ 45¢

Door Locks, Latches, &c —
 NOTE.—Net Prices are very often made
 on these goods.
 Reading Hardware Co., 40%
 R. & E. Mfg. Co., 10%

Padlocks—
 R. & E. Mfg. Co. Wrought Steel and
 Brass, 75¢ 10%

Sash, &c.—
 Ives' Patent:
 Crescent, 10%
 Automatic Gravity Metal Sash, ½
 doz., \$149.58, 10%
 Window Ventilating, 10%
 Pullman Patent Ventilating Lock, 25%
 Reading Sash Locks, 40%
 Taylor Mfg. Co., Perfect Ventilating,
 ½ doz., \$0.75 43¢ 10¢

Machines—Boring—
 Com. Up'r't, without Augers,
 \$2.00 43¢ 25¢
 Com. Ang'l'r, without Augers,
 \$2.25 43¢ 25¢

Ford Auger Bit Co., \$22.00
 Jennings' Nos. 1 and 4, 25¢ 7½¢
 Millers' Falls, 3.75
 Snell's, Upright, \$2.65; Angular, \$2.90
 Swan's Improved, 40¢ 10%

Corking—
 Reisinger Invincible Hand Power,
 ½ doz., \$48.00

Fence—
 Williams' Fence Machines, each, \$5.50

Hoisting—
 Moore's Anti-Friction Chain Hoist, 30%
 Moore's Hand Hoist, with Lock,
 20%
 Moore's Cyclone High Speed Chain
 Hoist, 25%

Ice Cutting—
 Chandler's, 12½%

Washing
 Boss Washing Machine Co.: Per doz.
 Boss No. 1, \$37.00
 Boss Rotary, \$37.00
 Champion Rotary Banner No. 1, \$37.00
 Standard Champion No. 1, \$50.00
 Standard Perfection, \$27.00
 Cincinnati Square Western, \$33.00
 Uneda American, Round, \$33.00

Mallets—
 Hickory, 45¢ 50¢
 Lignumvitæ, 45¢ 50¢

**Timbers' Hickory and Apple-
 wood, 45¢ 50¢**

Mangers, Stable—
 Swett Iron Works, 50%

Mats, Door—
 Acme Flexible Mat, 50%
 Elastic Steel (W. G. Co.), new list, 50%

Mattocks—
 See *Picks and Mattocks*.

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.—
 Enterprise Mfg. Co.:
 Coffee, 20¢ 25¢
 Shell and Corn, 25¢ 10¢
 National list Jan. 1, 1902, 30%
 Parker's Columbia and Victoria, 33½%
 Parker's Box and Side, 50¢ 10¢
 Swift, Lane Bros. Co., 30%

Motors, Water—
 Divine's Red Devil, 30%
 \$2.50 3.50 10.00 15.00, 33½%
 No. 1, 2
 Lippincott's:
 No., 1 2 3 4
 \$2.50 3.50 10.00 15.00, 33½%
 Pike Mfg. Co., Tool and Knife
 Grinding, 33½%

Mowers, Lawn—
 NOTE.—Net prices are generally quoted
 Cheapest, 10-in., \$2.00; advance
 10¢ for each size.
 Cheap, 10-in., \$2.25; advance 15¢
 20¢ for each size.
 Better Grade, 10-in., \$3.00; ad-
 vance 25¢ for each size.

High Grade, \$4.50 4.75 5.00 5.25
 Continental, 60%
 Great American, 70%
 Great American Ball B'r'g, new list, 70%
 Quaker City, 70%
 Pennsylvania, 60%
 Pennsylvania, Jr., Ball Bearing,
 50¢ 10¢ 5%
 Pennsylvania Golf, 50%
 Pennsylvania Horse, 33½¢ 5%
 Pennsylvania Pony, 40¢ 5%

Nails—
 Wire Nails and Brads, Miscel-
 laneous, 85¢ 85¢ 10%
 Cut and Wire, See *Trade Report*.
 Hungarian, Finishing, Upholster-
 ers', &c. See *Tacks*.

Horse—
 Nos. 6 7 8 9 10
 Anchor, 23 21 20 19 18, ½ lb.
 Coleman, 13 12 12 11 11, net, 12¢
 New Haven, 23 21 20 19 18, ½ lb.
 net, 12¢
 Livingston, 19 18 17 16 16, 10%
 Western, ½ lb. 8½¢
 Jobbers' Special Brands,
 per lb. 9¢

Picture—
 1½ 2 2½ 3 in.
 Brass Hd, gro., 45 55 60 70
 Por. Head, gro., 1.10 1.10 1.10

Upholsters—
 Brass, 30%
 Plated, 30¢ 10%

Nippers—
 See *Pliers and Nippers*.

Nipples—
 Standard Nipple Co.:
 Wrought Pipe Nipples, 20%

Nuts— Blank or Tapped.

Cold Punched: Off Hat
 Square, 5.50¢
 Hexagon, 5.90¢
 Square, O. T. & R., 5.70¢
 Hexagon, O. T. & R., 6.50¢

Hot Pressed: Off list.
 Square, 5.80¢
 Hexagon, 6.30¢

Oakum—
 Best, 10¢ 6½¢
 U. S. Navy, 10¢ 6¢
 Navy, 10¢ 5¢
 Plumbers' Spun Oakum, 2½¢ 3¢

Oil—
 Pike Mfg. Co., Stonoil, 40%

Oil Tanks—See Tanks, Oil.

Oilers—
 Steel, Copper Plated, 75%
 Chase or Paragon, 50¢ 10%
 Brass and Copper, 50¢ 10%
 Zinc, 65¢ 10¢ 70%
 Railroad, 60¢ 10¢ 40%
 Malleable, Hammers Improved, Nos.
 11, 12 and 13, 10%; Old Pattern,
 Nos. 1, 2, 3, 4, 50%
 American Tube & Stamping Co.:
 Spring Bottom Cans, 70¢ 70¢ 10%
 Railroad Oilers, &c., 60¢ 60¢ 10%
 Maple City Mfg. Co.:
 Spring Bottom Cans, 70¢ 70¢ 10%
 Railroad Oilers, &c., 60¢ 60¢ 10%

Openers—Packing Box—
 Herculever, ½ doz., \$21.00, 30%

Can Openers—
 Per doz.
 Sprague, Iron Handle, 30¢ 35¢
 Sprague, Wood Handle, 40¢
 Sardinia Scissors, \$1.75 3.00
 Can and Bottle Openers, ½ doz.,
 net: Yankee, \$0.75 40¢ 85¢; Little
 Gem, \$0.50 40¢ 65¢; Nifty, \$0.75

Egg—
 Hartigan Nickel Plate, ½ doz., \$2.00;
 Silver Plate, \$4.00.

Packing—
 Asbestos Packing, Wick and
 Rope, any quantity, 18¢ 20¢

Rubber—
 (Fair quality goods.)
 Sheet, C. I., 11¢ 12¢
 Sheet, C. O. S., 11¢ 12¢
 Sheet, C. B. S., 12¢ 13¢
 Sheet, Pure Gum, 40¢ 45¢
 Sheet, Red, 40¢ 50¢
 Jenkins' '96, ½ lb., 80¢ 25%

Miscellaneous—
 American Packing, 1 lb. 7¢ 10¢
 Cotton Packing, 1 lb. 16¢ 25¢
 Italian Packing, 1 lb. 9¢ 10¢
 Jute, 1 lb. 46¢ 54¢
 Russia Packing, 1 lb. 9¢ 10¢

Pails, Water, Well, &c.—
 See *Buckets*.

Paint—
 Dixon's Silica-Graphite, in 1 gal.
 pails and 5 gal. kegs, 25%; pack-
 ages of larger size, 20%

Pans— Dripping—
 Standard List, 75¢ 10¢ 80%
 Edwards, Royal Blue, 75%

Fry—
 Nos., 1 2 3 4 5
 Per doz., \$0.75 0.85 0.95 1.15 1.30

Refrigerator, Galva—
 Inch, 12 14 16 18
 Per doz., \$1.75 2.25 2.80 3.15

Paper—Building Paper
 Asbestos, 1 lb.
 Roll Board or Building Felt,
 6 to 30 lb., per 100 sq. ft., 2½¢
 Roll Board or Building Felt,
 3-32 and ½ in., 45 to 60 lb.,
 per 100 sq. ft., 3½¢
 Mill Board, Sheet, 40 x 40 in.,
 1-32 to ½ in., 3¢
 Per roll.
 Rosin Sized Sheathing: 500 sq. ft.
 Light weight, 25 lbs. to roll, 48¢ 58¢
 Medium weight, 30 lbs. to roll, 50¢ 70¢
 Heavy weight, 40 lbs. to roll, 75¢ 78¢

Black Water Proof Sheathing,
 500 sq. ft., 1 ply, 65¢; 2 ply,
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
 Deafening Felt, 3, 6 and 4½ sq.
 ft. to lb., ton, \$54.50
 Red Rope Roofing, 250 sq. ft.
 per roll, \$1.75

Tarred Paper—
 1 ply (roll 400 sq. ft.), ton,
 \$34.00 43.00
 2 ply, roll 108 sq. ft., 65¢
 3 ply, roll 108 sq. ft., 88¢
 Slater's Felt (roll 500 sq. ft.), 80¢

Sand Paper and Cloth—
 Flint and Emery, 50¢ 10%
 Garnet Paper and Cloth, 25%

Parers—Apple—
 Goodell Co.:
 Family Bay State, ½ doz., \$15.00
 Improved Bay State, ½ doz., \$36.00
 New Lightning, ½ doz., \$7.00
 Turn Table, ½ doz., \$6.00
 White Mountain, ½ doz., \$5.00
 Romanza Improved, each \$7.50
 Dandy, each \$10.00
 Eureka Improved, each \$20.00
 New Century, each \$20.00
 Ranger, each \$30.00

Livingston Nail Co.:	
Daisy	per doz. \$4.00
Little Star	per doz. \$5.00
Rocking Table	per doz. \$6.20
Reading Hardware Co.:	
Advance	per doz. \$4.00
Halwin	per doz. \$4.00
Reading 72	per doz. \$3.25
Reading 78	per doz. \$6.25

Orange—

Goodell Co., Success	each \$20.00
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Potato—

Saratoga	per doz. \$7.00
White Mountain	per doz. \$6.00

Picks and Mattocks—

(List Jan., 1908.)

List	75¢10%
Cronk's Handled Garden Mattock	
per doz.	\$3.00 33½%

Pinking Irons—

See Irons, Pinking.

Plns, Escutcheon—

Brass	50¢50¢10%
Iron, list Nov. 11, '85	60¢60¢10%

Pipe, Cast Iron Soil—

Standard, 2-6 in.	70¢10%
Extra Heavy, 2-6 in.	75¢10¢80%
Fittings, Standard and Heavy	80¢10¢85%

Pipe, Merchant—

Carloads to Consumers:

	Steel.	Iron.	Bk. Gale.	Bk. Galv.
1/4 and 1/2 in.	60	60	60	60
3/4 in.	68	68	68	68
1 in.	70	70	70	70
1 1/4 in.	74	74	74	74
7 to 12 in.	71	71	71	71

Pipe, Vitriol Sewer—

Carload lots.

Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:	
First-class	87%
Second-class	90%

Pipe, Stove—

	Per 100 joints.	C. L. L. C. L.
Edwards' Nested:		
5 in., Standard Blue	\$6.25	\$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color	\$5.90	\$6.90
6 in., Uniform Color	6.40	7.40
7 in., Uniform Color	7.40	8.40

Planes and Plane Irons—**Wood Planes—**

Bench, first qual.	30¢30¢10%
Bench, second qual.	40¢40¢10%
Molding	25¢25¢10%
Chapin-Stephens Co.:	
Bench, First Quality	30%
Bench, Second Quality	40%
Molding and Miscellaneous	25%
Toy and German	30%
Union	60%

Iron Planes—

Chaplin's Iron Planes	60%
Union	60%

Plane Irons—

Wood Bench Plane Irons, list Dec. 12, '06	25%
Buck Bros.	30%
Chapin-Stephens Co.	50%
L. & J. White	20¢25%

Planters, Corn, Hand—

Kohler's Eclipse	per doz. \$7.50
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Plates—

Felloy	10.3%4¢
Avery Stamping Co.	
Standard Wrot. Steel Felloy Plates in 100 lb kegs, per 100 lb, 3/4-in. to 1 1/4-in., \$4.00 net; 1 1/4-in. to 2-in., inclusive, \$3.75 net.	

Steel Pipe Hook—

Never-Break	75¢10%
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Pliers and Nippers—

Button Pliers	75¢50¢75¢10¢65%
Gas Burners, per doz., 5 in.	\$1.25
@ \$1.30; 6 in.	\$1.45, \$1.50.
Gas pipe, 7 8 10 12-in.	\$2.00 \$2.25 \$2.75 \$3.50
Acme Nippers	50¢85%
Cronk & Carrier Mfg. Co.:	
American Button	80%
Improved Button	75¢10%
Cronk's	60%
No. 69 Lineman	45%
Stub's Pattern	35%
Combination and others	35%
Heller's Farriers' Nippers, Pincers and Tools	40¢50¢10¢10¢5%
P. S. & W. Timmers' Cutting Nippers	40%
Swedish Side, End and Diagonal Cutting Pliers	50%
Utica Drop Forge & Tool Co.	
Pliers and Nippers, all kinds	40%

Plumbs and Levels—

Chapin-Stephens Co.:	
Plumbs and Levels	30¢20¢10%
Chapin's Imp. Brass Cor.	40¢40¢10%
Pocket Level	30¢30¢10%
Extension Sights	30¢30¢10%
Machinists' Levels	40¢40¢10%
Diston's Plumb and Levels	60¢10%
Diston's Pocket Levels	60¢10%
Stanley's Duler	3%
Woods' Extension	35%

Points, Glaziers'—

Bulk and 1-lb. papers	10.9 ¢
1/2-lb. papers	10.9 ¢
1/4-lb. papers	10.10 ¢

Police Goods—

Manufacturers' Lists	25¢25¢65%
Tower's	25%

Polish—Metal, Etc—

Ladd Co.:	
Putzade Liquid	per gro. 1/2 pta. \$12.00; 1 pta. \$20.00; 1 qta. \$40.00;
per doz. 1/2 gal. \$6.35; 1 gal. \$12.00.	
Prestoline Liquid, No. 1 (1/4 pt.)	per doz. \$3.00; No. 2 (1 qt.) \$9.00. 10%
Prestoline Paste	40%
George William Hoffman:	
U. S. Metal Polish Paste, 3 oz. boxes, per doz. 50¢; per gro. \$1.50;	
1/2 lb boxes, per doz. \$1.25; 1 lb boxes, per doz. \$2.25.	
U. S. Liquid, 8 oz. cans, per doz., \$1.25.	
Barkeepers' Friend Metal Polish, per doz., \$1.75.	

Stove—

Black Eagle Benzine Paste, 5 lb cans, per doz. 75¢	
Black Eagle, Liquid, 1/2 pt. cans, per doz. 75¢	
Black Jack Paste, 1/2 lb cans, per gr. \$3.00	
Black Kid Paste, 5 lb cans, each, \$0.65	
Ladd's Black Beauty Liquid, per 100 tin	\$6.75
Joseph Dixon, per gr. \$5.75	10%
Dixon's Plumbago	per lb \$6.50
Fireside	per gr. \$2.50
Gem, per gr. \$4.50	10%
Japanese	per gr. \$3.50
Jet Black	per gr. \$3.50
Peerless Iron Enamel, 10 oz. cans, per doz. \$1.50	

Window Polish—

Benj. P. Forbes:	
Glasbrite, No. 2, gal pails, per doz., \$24.00; each, \$2.60; 1 lb cans, each, 75¢	
Glasbrite Powder, bbls., per 20¢	

Peppers, Corn—

1 qt. Square	per doz. \$0.80; per gro. \$8.75
1 qt. Round	per doz. \$0.90; per gro. \$10.00
1 1/2 qt. Square	per doz. \$1.20; per gro. \$12.00
2 qt. Square	per doz. \$1.50; per gro. \$15.00

Post Hole and Tree Augers and Diggers—

See also Diggers, Post Hole, etc.

Posts, Steel—

Steel Fence Posts, each, 6 ft., 46¢;	
6 1/2 ft., 48¢; 7 ft., 50¢.	
Steel Hitching Posts, each \$1.30	

Potato Parers—

See Parers, Potato.

Pots, Glue—

Enameled	40%
Tinned	30¢10%

Powder—

In Canisters:	
Duck, 1 lb.	each 45¢
Fine Sporting, 1 lb.	each 75¢
Rifle, 1/4 lb.	each 15¢
Rifle, 1 lb.	each 25¢
In Kegs:	
25-lb. kegs	\$3.50
25-lb. kegs	\$4.50
King's Semi-Smokeless:	
Keg (25 lb bulk)	\$6.50
Half Keg (12 1/2 lb bulk)	\$3.50
Quarter Keg (6 1/4 lb bulk)	\$1.90
Case 24 (1 lb cans bulk)	\$8.50
Half case (1 lb cans bulk)	\$4.50
King's Smokeless:	
Shot Gun, Rifle	\$12.00
Half Keg (12 1/2 lb bulk)	6.25 7.75
Quarter Keg (6 1/4 lb bulk)	3.25 4.00
Case 24 (1 lb cans bulk)	14.00 17.00
Half case 12 (1 lb c. bk.)	7.25 8.75

Presses—

Fruit, Wine and Jelly—	
Enterprise Mfg. Co.	20¢25%

Seal Presses—

Morrill's No. 1, per doz., \$20.00	50%
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Pruning Hooks and Shears

See Shears.

Pullers, Nail, Etc.—

Cyclops	50%
Miller's Falls, No. 3, per doz., \$12.00.	
Morrill's No. 1, Nail Puller, per doz. \$20.00	50%
Pearson No. 1, Cyclone Spike Puller, each \$30.00	50%
The Scranton Co., Case Lots:	
No. 2B (large)	\$5.50
No. 3B (small)	\$5.00
Smith & Hemenway Co.:	
Diamond B.	70%
Giant	50%
Staple Pullers, Utica and Davison	60%
Taylor Mfg. Co., Sampson Tack	\$0.40

Pulleys, Single Wheel—

Inch	1 1/4 1 3/4 2 3
Avining or Tackie	
per doz.	\$0.50 15 60 1.05
Hay Fork, Steel or Solid Eye	
per doz., 4 in.	\$1.25; 5 in., \$1.55
Inch	2 2 1/4 2 1/2
Hot House, doz.	\$0.65 85¢ 1.20
Inch	1 1/4 1 3/4 2
Screw, doz.	\$0.16 19 23 30
Inch	1 1/4 2 2 1/4 2 1/2
Side, doz.	\$0.25 40 55 60
Inch	1 1/4 1 3/4 2 2 1/2

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1 1/4 and 2 in.	17¢20¢
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Auger Mortise, no Pace Plate,

per doz., 1 1/4 and 2 in. 20¢21¢

Acme, No. 35, 1 1/4 in., 19¢; 2 in., 20¢**American Pulley Co.:**

Wrought Steel American Plain	50¢10%
Wrought Steel Eagle	17¢20¢
Top Notch, Electrically Welded	
Nos. 3 and 4	19¢
Common Sense	per doz. 20¢
For-All-Steel, Nos. 3 and 7, 2 in.	
Grand Rapids All Steel Noiseless	50%
Niagara, No. 25, 1 1/4 in., 19¢; 2 in.	20¢
No. 26 Troy, 1 1/4 in., 14¢; 2 in., 16¢	
Star, No. 26, 1 1/4 in., 19¢; 2 in., 20¢	
Tackle Blocks—See Blocks.	

Pumps—

Cistern	60%
Pitcher Spout	75¢50¢75¢10%
Wood Pumps, Tubing, etc.	50%
Barnes Dbl. Acting (low list)	50%
Barnes Pitcher Spout	80%
Contractors' Rubber Diaphragm, No. 2, B. & L. Block Co.	\$16.00
Daisy Spray Pump	per doz. \$6.50
Flint & Walling's Fast Mail Hand (low list)	50¢5%
Flint & Walling's Fast Mail (low list)	50¢5%
Flint & Walling's Tight Top Pitcher	80%
National Specialty Mfg. Co., Measuring, Nos. 2, \$6.00; 3, \$5.50	30%
Meyers' Pumps (low list)	50%
Meyers' Power Pumps	50%
Meyers' Spray Pumps	50%

Pump Leathers—

Plunger and Valve Leathers—Per gro.:	
No. 1	5.00
No. 2	6.00
No. 3	7.00
No. 4	8.00
Cup Leathers—Per 100:	
Inch	2 1/2 3 3 1/2 4
	\$5.00 7.00 9.00 12.00

Punches—

Saddlers' or Drive, good, doz. 50¢75¢	
Spring, single tube, good quality	\$1.75
Revolving (4 tubes)	doz. \$3.50
Bemis & Call Co.'s Cast St'l Drive	50%
Morrill's Nos. 1AA, 1A, 1B, 1C	50%
Hercules 1 die, each \$5.00	50%
Niagara Hollow Punches	40%
Niagara Solid Punches	55¢10%
Timmers' Hollow P., S. & W. Co.	40%
Timmers' Solid P., S. & W. Co.	40%
doz., \$1.44	40¢10%

Rail—Barn Door, &c.—**Sliding Door, Painted Iron,**

2 1/4¢2 1/4¢

Sliding Door, Wrought Brass,

1 1/4 in., 1 lb., 36¢

Cronk's:

Double Braced Steel Rail, per ft. 2 1/4¢

O. N. T. Rail, 2 1/4¢

Griffin's:

per 100 ft., 1 x 3-16 in., \$3.25;

1 1/4 x 3-16 in., \$3.75.

Hinged Hanger, per 100 ft., 1 x 3-16 in., \$3.50; 1 1/4 x 3-16 in., \$4.00.

Lane's:

Hinged Track, per 100 ft., \$3.45

O. N. T., per 100 ft., 1 in., \$3.12 1/2;

1 1/4 in., \$3.45; 1 1/2 in., \$4.00.

Standard, 1 1/4 in., per 100 ft. \$4.00

Lawrence Bros.:

1 x 3-16 in., per 100 ft., \$7.50; 1 1/4 x 3-16 in., \$8.75

Trolley, No. 301, per ft. \$0.9¢

McKinney's:

Hinged Hanger Track, per ft., 11¢

Myers' Stayon Track
Richards Mfg. Co.:	
Common 1 x 3-16 in., \$3.00; 1 1/4 x 3-16 in., \$3.25; 1 1/2 x 3-16 in., \$3.50.	
Special Hinged Hanger Rail, 60¢10%	
Lag Screw Rail, No. 65	60%
Gauge Trolley Track, per ft., No. 31, 9¢; No. 32, 11¢; No. 33, 20¢.	
No. 50	60¢10%
No. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64, \$4.00; 45, \$3.25; 46, \$3.50; 49, No. 1, \$3.25; 49, No. 2, \$3.50.	
Rakes—

NOTE—Many goods are sold at net prices.

American Fork & Hoe Co.:

Lawn, per doz., No. 24, \$2.50; No. 20

Cronk's:

Steel Garden: Champion, per doz., 12-tooth, \$3.75; 14-tooth, \$4.00; 16-tooth, \$4.25; Ideal, per doz., 12-tooth, \$3.00; 14-tooth, \$3.30; 16-tooth, \$3.60.

Victor, 12-tooth, \$2.25; 14-tooth, \$2.50; 16-tooth, \$2.75.

Queen City Lawn, per doz., 20 teeth, \$2.85; 24, \$3.00.

Anticlog Lawn, per doz., \$4.00

Malleable Garden, 70¢10%

Ideal Steel Garden, per doz., 12 teeth, \$15.00; 14, \$16.00; 16, \$18.00.

Kohler's:

Jumbo Lawn, 36-tooth, per doz. \$5.00

Lawn Queen, 20-tooth, per doz. \$2.85

Lawn Queen, 24-tooth, per doz. \$3.00

Paragon, 20-tooth, per doz. \$2.65

Paragon, 24-tooth, per doz. \$2.75

Steel Garden, 14-tooth, per doz. \$2.10

Malleable Garden, 14-tooth, per doz. \$1.75@2.00

Rasps, Horse—Diston's
Heller Bros.	70¢50¢70¢10¢5%
Liveright Bros.' Gold Medal	70¢10¢75%
McCaffrey's American Standard	60¢10¢5%
New Nicholson	70¢10¢75%
See also Files.	
Razors—

John Engstrom Swedish.....	\$5
Sharp Shaver.....	60
Fox Razors, 3 doz., No. 42,	} Dis. 50
\$24.00; No. 44, \$20.00; No. 82,	
Platina, \$36.00.	

Sausage Stuffers or FillersSee *Stuffers or Fillers, Sausage.***Saw Frames—**See *Frames, Saw.***Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Saws—**

Atkins':
Circular.....45%
Band.....50@50&10%
Butcher Saws.....50%
Cross Cuts.....35%
One-Man Cross Cut.....40%
Narrow Cross Cut.....50%
Hand, Rip and Panel.....35&5%
Miter Box and Compass.....40%
Mulay, Mill and Drag.....45%
Wood Saws.....40&10%

Chapin-Stephens Co.:
Turning Saws and Frames.30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&10%

Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 18 in. wide.....60%
Band, 1/4 to 1 1/2.....60%
Crosscuts.....45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....25%
Woodsaw Blades.....15%
Woodsaw Rods, Tuned.....15%
Hand Saws, Nos. 12, 99, 9, 16, d100,
D8, 120, 76, 77, 8.....25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1,
0, 00, Combination.....30%
Compass Key Hole, &c.....25%
Butcher Saws and Blades.....30%
C. E. Jennings & Co.'s:
Back Saws.....16%
Butcher Saws.....25&7 1/2%
Compass and Key Hole Saws.....33 1/2&7 1/2%

Framed Wood Saws.....25&7 1/2%
Hand Saws.....12%
Wood Saw Blades.....33&7 1/2%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Massachusetts Saw Works:
Victor Kitchen Saws.....40&10&50%
Butcher Saws Blades.....35@40%
Peace & Richardson's Hand Saws.30%
Simonds':
Circular Saws.....45%
Crescent Ground Cross Cut Saws.30%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws.45%
Band Saws.....50%
Back Saws.....25@25&7 1/2%
Butcher Saws.....35@35&7 1/2%
Hand Saws.....25@25&7 1/2%
Hand Saws, Bay State Brand.....45%
Compass, Key Hole, &c.....25@25&7 1/2%
Wood Saws.....40&7 1/2%
Wheeler, Madden & Clemons Mfg.
Co.'s Cross Cut Saws.....50%

Hack Saw Blades and**Frames—**

Atkins' Hack Saw Blades A A A.25%
Disston's:
Concave Blades.....25%
Keystone Blades.....35%
Hack Saw Frames.....30%
Simonds, 25%; The Best, 35%
Culley.....35%
C. E. Jennings & Co.:
Hack Saw Frames, Nos. 175, 180.....40&7 1/2%
Hack Saws, Nos. 175, 180, complete.....40&7 1/2%
Goodell's Hack Saw Blades.....40&10%
Griffin's Hack Saw Blades.....35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.30&10&5%
Sterling Hack Saw Frames.30&10&10%
Sterling Power Hack Saw Machines,
each, No. 1, \$25.00; No. 2, \$30.00.....10%
Victor Hack Saw Blades.....40%
Victor Hack Saw Frames.....40%
Whitaker Mfg. Co.:
National Hand Blades, Hand
Frames, Power Blades.....40%

Scroll—

Barnes, No. 7, \$15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw,
without boring attachment, \$20.....20%
with boring attachment, \$20.....20%
Lester, complete, \$10.00.....15&10%
Rogers, complete, \$3.50 and \$4.00.....15&10%

Scales—

Union Platform, Plain.\$2.10 @ 2.20
Union Platform, Stpd.\$2.20 @ 2.30
Chattillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
The Standard Portables.....40%
The Standard R. R. and Wag-
on.....50&10%

Scrapers—

Box, 1 Handle.....doz.\$1.85@2.10
Box, 2 Handle.....doz.\$2.35@2.50
Ship.....Light, \$2.00; Heavy, \$1.50
Chapin-Stephens Co., Box.30@30&10%
Richards Mfg. Co., Foot.....60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., \$2.50@
2.75; 1 1/2, \$3.00@3.25; 1 3/4, \$3.50@3.75
Bench, Wood.....20@20&10%
Hand, Wood.....70&10@70&10&10%
Chapin-Stephens Co., Hand.....70@70&10&2 1/2%

Coach, Lag and Hand Rail—

Lag, Cone Point.....80&5%
Coach, Gilet Point.....80%
Hand Rail.....70&10@75%
Jack Screws—
Standard List.....70&10@75%
Millers Falls.....50&10&10%
Swett Iron Works.....70@75%

Machine—

Cut Tread, Iron, Brass or

Bronze:

Flat Head or Round Head.

Fullister Head.....50&10&10%

Rolled Thread, F. H. or R. H.,

Iron.....75&10%

F. H. or R. H., Brass, Nos.

8 to 14.....65&10%

Set and Cap—

Set (Iron).....75&10&7 1/2%

Set (Steel), net advance over

Iron.....25%

Sq. Hd. Cap.....70&10&7 1/2%

Hex. Hd. Cap.....70&10&7 1/2%

Rd. Hd. Cap.....50&7 1/2%

Fullister Hd. Cap.....60&7 1/2%

Wood—

List July 23, 1903.

Flat Head, Iron.....87 1/2&50%
Round Head, Iron.....85&50%
Flat Head, Brass.....80&50%
Round Head, Brass.....75&50%
Flat Head, Bronze.....72 1/2&50%
Round Head, Bronze.....72 1/2&50%
Drive Screws.....87 1/2&50%**Scroll Saws—**See *Saws, Scroll.***Scythes—**

Per doz.

Plain Grass, Cutting Edge Pol-
ished.....\$6.25@6.50

Clipper, Bronzed Web.\$6.50@6.75

Solid Steel, Web and Bucks Pol-
ished.....7.00@7.25

Bush, Weed and Bramble.

Painted.....\$6.50@6.75

Grain, Painted, Cutting Edge

Polished.....\$8.25@8.50

Clipper Grain, Bronze Web.

\$8.50@8.75

Seeders, Raisin—

Enterprise.....25@30%

Sets—Awl and Tool—

Fray's Tool Handles, Nos. 1, \$12;

2, \$16; 3, \$12.....50%

Millers Falls Adj. Tool Handles, No.

1, \$12; No. 4, \$12; No. 5, \$18.....20&10%

Garden Tool Sets—

American Fork & Hoe Co.:

Rake, Shovel and Hoe, 1/2 doz, sets,

No. 3 P F.....\$7.25

Sets, Nail—

Octagon.....gro.\$3.50@3.75

Buck Bros.....27 1/2%

Mayhew's.....\$9.00

Snell's Corrugated, Cup Pt.....40&10%

Snell's Knurled, Cup Pt.....40&10%

Victor Knurled, Cup Pt.....\$7.50

Rivet—

Regular list.....75@75&10%

Saw—

Atkins':

Criterion.....40%

Adjustable.....40%

Disston's Star, Monarch and Tri-
umph.....30%

Morrill's No. 1.....\$15.00

Nos. 3 and 4, Cross Cut.....\$20.60

No. 5 Mill.....\$15.60

No. 10, 11, 95.....\$10.00

No. 1 Old Style.....\$16.25

Special.....\$16.25

Giant Royal Cross Cut.....\$7.50

Royal, Hand.....\$4.50

Taintor Positive.....\$6.75

Shaving—

Fox Shaving Sets, No. 30.....

1/2 doz., net, \$24.00

Smith & Hemenway Co.'s.....75%

Sharpeners, Knife—

Pike Mfg. Co.:

Fast Cut Pocket Knife Hones,
1/2 doz.....\$1.50Mounted Kitchen Sand Stone,
1/2 doz.....\$1.50

Natural Grit Carving Knife

Hones, 1/2 doz.....\$3.00

Quick Cut Emery Carving

Knife Hones, 1/2 doz.....\$1.50

Quick Edge Pocket Knife

Hones, 1/2 doz.....\$2.50

Skate—

Smith & Hemenway Co., Eureka.50%

Shaves, Spoke—

Iron.....doz.\$1.25

Wood.....doz.\$2.00

Bailey's (Stanley R. & L. Co.).....45%

Chapin-Stephens Co.....30@30&10%

Goodell's, 1/2 doz, \$9.00.....15&10%

Shears—

Cast Iron.....7 8 9 in.

Best.....\$16.00 18.00 20.00 gro.

Good.....\$13.00 15.00 17.00 gro.

Cheap.....\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.:

Best quality Jap.....70&10&5%

Best Quality Nickel.....60&10&5%

Tailors' Shears.....40@40&10%

Acme Cast Shears.....40&40&5%

Heinrich's Tailors' Shears.....10%

National Cutlery Co.'s Nickel Plated,
60&10%; Japan Handles.....70&10%Columbian Cutlery Co.:
Sheep, 1900 list.....30&10&5%
Grass.....50&10%
Horse or Mule.....50&10%
J. Wiss & Sons Co.:
Best Quality Jap'd.....60&10%
Best Quality Nickle.....50&10%
Tailors.....25%**Tinners' Snips—**

Steel Blades.....80&5@80&10%

Steel Laid Blades.....80&5@80&10%

Acme Cast Snips.....40&45&5%

Forged Handles, Steel Blades, Ber-
lin.....50%

Heinrich's Snips.....40%
Jennings & Griffin Mfg. Co.'s 6 1/2 to
10 in.....33&7 1/2%
National Cutlery Co.'s Forged Steel.50%
Niagara Snips.....40%
P. S. & W. Forged Handles, 25%
W. R. W.....50%
J. Wiss & Sons Co.:
Wiss Forged Steel.....25%

Pruning Shears—

Cronk's Hand Shears.....33 1/2%
Cronk's Wood Handle Shears.....33 1/2%
Disston's Combined Pruning Hook
and Saw, 1/2 doz, \$18.00.....25%
Disston's Pruning Hook only, 1/2
doz., \$12.00.....25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades.....40%
P. S. & W. Co.....40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand.....60&10%
Lawn and Border, Wilcut Brand.
60&10%

Sheaves—Sliding Door—

Reading.....40%

R. & E. list.....15%

Sliding Shutter—

Reading list.....40%

R. & E. list.....15%

Shells—Shells, Empty—

Brass Shells, Empty:

Climax, 10 and 12 gauge.....60&5%

Club, Kival, 65&5%; First Quality,
60&5%

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge.
25&10%Climax, 10 and 12 gauge; Acme and
Magic, 10, 12, 16 and 20 gauge;
Ideal, 10, 12, 16 and 20 gauge;
Leader grade.....25&5%Union, League, 10 and 12 gauge.
25%New Climax, Defiance, 10, 12, 14,
16 and 20 gauge; Climax, 14, 16
and 20 gauge.....20%Challenge, Monarch, 10, 12, 16 and
20 gauge; League, Union, 14, 16
and 20 gauge; Repeater Grade.....20%**Shells, Loaded—**

Loaded with Black Powder.....40%

Loaded with Smokeless Powder,
medium grade.....40&5%Loaded with Smokeless Powder,
high grade.....40&10&10%Union Metallic Cartridge Co.:
New Club, Black Powders.....40%Nitro Club, Smokeless Powders,40&5%
Arrow, Smokeless Powders,40&10&10%
Winchester:
Smokeless Repeater Grade.....40&5%
Smokeless Leader Grade.....40&10&10%
Black Powder.....40%**Shingles, Metal—Per Sq.**

Edwards Mfg. Co.:

Painted. Galv.

14 x 20.....\$4.25 \$6.00

10 x 14.....4.50 6.25

7 x 10.....4.75 6.50

Wheeler Corrugating Co.:
Dixie, 14 x 20 in.....\$4.05

Dixie, 10 x 14 in.....4.25

Dixie, 7 x 10 in.....5.45

Dixie, 7 x 10 in.....5.25 6.70

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:

Iron.....per keg.\$4.10

Steel.....per keg.\$3.85

Burdens', all sizes.....per keg.\$3.90

Shot—

25-lb. bag.

Drop, up to B.....\$1.80

Drop, B and larger.....2.05

Buck.....2.05

Chilled.....2.05

Dust.....2.30

Shovels and Spades—

Association List.....40&7 1/2@40&10%

Avery Stamping Co.....40%

Snow Shovels—

Long Handle.....\$2.50@2.75

Wood and Mall, D Handle.
\$2.65@2.90**Sieves and Sifters—**

Hunter's Imitation, gro.....\$9.50

Hunter's Genuine, per gro.\$12.00

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme

Automatic Ash Sifter, each, \$3.25;
1/2 doz.....\$39.00**Sieves, Seamless Metallic**

Per dozen.

Mesh.....1 1/2 16 18 20

Iron Wire.....\$1.05 1.05 1.10 1.20

Tinned Wire.\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.

Mesh 18, Nested.....doz.\$0.90@0.95

Mesh 20, Nested.....doz.\$1.00@1.05

Mesh 24, Nested.....doz.\$1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:

12 x 12 to 22 x 36 in.....60%

20 x 24 to 24 x 50 in.....50%

24 x 60 to 24 x 120 in.....30%

Barnes' low list.....60%

NOTE—There is not entire uniformity
in lists used by jobbers.**Skins, Wagon—**

Cast Iron.....70@75&10%

Steel.....40@45%

Slates, School—

Factory Shipments.

"D" Slates.....50@50&10%

Eureka, Unexcelled Noiseless.
60&7 tens.

Victor A, Noiseless.80&4 tens 45%

Slaw Cutters—See Cutters.**Snaps, Harness—**

German.....40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee
Roller, 30&2%
High Grade, 40%; Trojan.....40%
Jockey.....25%

Snaths—

Grass Scythe.....50@50&5%

Snips, Tinners—See Shears.**Spoons and Forks—****Silver Plated—**

Good Quality.....50&10@60&5%
Cheap.....60@60&10%
International Silver Co.:
1817 Rogers Bros.....40&10%
Rogers & Bro., William Rogers
Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Sons.....60&10%

Miscellaneous

German Silver.....60@60&5%

Tinned Iron—

Teas.....per gro.50@55¢

Tables.....per gro.\$0.90@1.00

Scythe Stones—

Pike Mfg. Co., 1907 list:	
Black Diamond S. 8. 1/2 gro.	\$12.00
Lamotte S. 8. 1/2 gro.	\$11.00
White Mountain S. 8. 1/2 gro.	\$9.50
Green Mountain S. 8. 1/2 gro.	\$7.00
Extra Indian Pond S. 8. 1/2 gro.	\$8.00
No. 1 Indian Pond S. 8. 1/2 gro.	\$7.50
No. 2 Indian Pond S. 8. 1/2 gro.	\$5.00
Leader Red End S. 8. 1/2 gro.	\$5.00
Quick Cut Emery. 1/2 gro.	\$10.00
Pure Corundum. 1/2 gro.	\$18.00
Crescent. 1/2 gro.	\$7.00
Emery Scythe Rifles, 2 Coat.	\$8.80
Emery Scythe Rifles, 4 Coat.	\$11.00
Emery Scythe Rifles, 4 Coat.	\$13.50
Balance of 1907 list.	33 1/2%
Lectro (Artificial). 1/2 gro.	\$12.00
Lightning (Artificial). 1/2 gro.	\$18.00

Stoppers, Bottle—

Victor Bottle Stoppers. 1/2 gro.	\$9.00
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Stops—Bench—

Millers Falls. 15&10%	
Morrill's, No. 1, 10.00.	50%
Morrill's, No. 2, 12.50.	50%

Door—

Chapin-Stevens Co. 50&50&10%	
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Plane—

Chapin-Stevens Co. 20%	
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Straps—Box—

Acme Embossed, case lots. 20&10&10%	
Cary's Universal, case lots. 20&10&10%	

Stretchers, Carpet—

Cast Iron, Steel Plates. doz. 55¢	
All Steel Socket. doz. \$2.00 to \$2.25	
Excelsior Stretcher and Tack Hammer Combined. doz. \$6.00.	20%

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses. 25&25&10%	
National Specialty Co., list Jan. 1, 1902. 30&5%	
P., S. & W. Co. 40&10&5%	

Sweepers, Carpet—

NOTE.—Leading Manufacturers give the following rebates from list prices: 50¢ per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks. 90&50&—	
American Cut Tacks. 90&50&—	
Succede's Cut Tacks. L. 90&30&—	
Succede's Upholsterers'. 90&30&—	
Gimp Tacks. 90&30&—	
Lace Tacks. 90&30&—	
Trimmers' Tacks. 90&30&—	
Looking Glass Tacks. 63&—	
Bill Posters' and Railroad Tacks. 90&40&—	
Hungarian Nails. 8&—	
Finishing Nails. 70&—	
Trunk and Clout Nails. 75&—	

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks. 90&6 tens&—	
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Tanks, Oil and Gasoline—

Wilson & Friend Co.: Oil	
Gal. Gasoline	\$3.00
30	\$2.75
60	\$3.50
110	\$5.00

Tapes, Measuring—

American Asses' Skin. 50&—	
Patent Leather. 25&30&5%	
Steel. 33 1/2&5%	
Chesterman's. 25&35&5%	
Keuffel & Esser Co.: Favorite, Ass Skin. 40&10&50%	
Favorite, Duck and Leather. 25&35&10%	
Metallic and Steel, lower list, 35&35&5%; Pocket, 35&35&5%.	
Lufkins: Asses' Skin. 40&10&50%	
Metallic. 30&30&5%	
Patent Bend, Leather. 25&35&10%	
Pocket. 40&40&5%	
Steel. 33 1/2&35%	
Wichus & Hilger: Chesterman's Metallic, No. 31L. etc. 25%	
Chesterman's Steel, No. 1038L. etc. 35%	

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/2-inch and larger, per 100 lb.	\$2.55 to \$3.00
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Thermometers—

Tin Case, Cabinet, Flange. Dairy, &c. 30&35%	
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Ties, Bale—Steel Wire—

Single Loop. 87 1/2&10%	
Monitor, Cross Head, &c. 70&8 1/2%	

Tinners' Shears, &c.—

See Shears, Tinners', &c.	
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Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.	
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Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.	
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Tools—Coopers'—

L. & I. J. White. 20&20&5%	
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Haying—

Myers' Hay Tools. 50%	
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Ice Tools—

Gifford-Wood Co. 15%	
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Miniature—

Smith & Hemenway Co.'s. Davidson. 1/2 doz., Nickel Plated, \$1.50; Gold Plated. \$2.00	
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Saw—

Atkins' Cross Cut Saw Tools. 35&5%	
Simond's Improved. 33 1/2%	
Simonds' Crescent. 30%	

Ship—

L. & I. J. White. 25%	
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Torches—

Hammers, Engine. 1/2 doz. \$4.50	
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Transom Lifters—

See Lifters, Transom.	
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Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15 to \$1.25; gro. \$11.50 to \$12.00	
Harper, Champion or Paragon, doz., \$1.25 to \$1.40; gro. \$13.00 to \$13.50	

Game—

Imitation Oneida. 75&10%	
Newhouse. 50&5%	
Hawley & Norton. 65&10%	
Victor. 75&75&10%	
Oneida Community Jump. 70&5%	
Stop Thief. 60%	
Tree Trap. 60%	
Hector. 75&75&10%	

Mouse and Rat—

Mouse, Wood, Choker, doz. holes. 12¢	
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Mouse, Round or Square Wire, doz. 85¢ to 90¢	
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Marty French Rat and Mouse Traps (Genuine). 1/2 doz. 12¢	
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Crate lots. Small lots.	
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No. 1, Rat. \$11.50 \$14.50	
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No. 2, Rat. \$5.75 \$8.50	
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No. 3, Rat. \$4.70 \$5.25	
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No. 5, Mouse. \$2.25 \$3.00	
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Animal Trap Co.: Out o' Sight, Mouse. 1/2 doz. \$0.60	
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Out o' Sight, Rat. 1/2 doz. 1.20	
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Easy Set, Mouse. 1/2 doz. .35	
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Easy Set, Rat. 1/2 doz. .85	
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Out o' Sight Chockers, 1/2 doz. holes. .12	
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Out o' Sight, Tin, 5-hole, 1/2 doz. traps. .75	
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Trowels—

Disston Brick and Pointing. 25%	
Disston Plastering. 20%	
Disston "Standard Brand" and Garden Trowels. 30%	
Kohler's Steel Garden Trowels, 1/2 gro. 5 in. \$4.80; 6 in. \$6.00.	
Never-Break, Forged Steel Garden Trowels, in bulk, net 1/2 gro. \$5.50	
In 1 doz. boxes. 1/2 gro. \$6.00	
Woodrough & McParlin, Plastering. 25%	

Trucks, Warehouse, &c.—

B. & L. Block Co.: New York Pattern. 50&10%	
Western Pattern. 50&10%	
Handy Trucks. 1/2 doz. \$16.00	
Grocery. 1/2 doz. \$15.00	
McKinney Trucks. each, net \$10.00	
Model Stove Trucks. 1/2 doz. \$18.50	

Tubs, Wash—

M'fgr's list, price per gross.	
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No. 0 1 2 3	
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Galvanized. \$67 \$79 \$89 \$99 10&7 1/2 &c&5%	
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Twine, Miscellaneous—

Flax Twine:	
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No. 9, 1/4 and 1/2-lb. Balls. 21 to 23¢	
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No. 12, 1/4 and 1/2-lb. Balls. 19 to 21¢	
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No. 18, 1/4 and 1/2-lb. Balls. 16 to 18¢	
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No. 24, 1/4 and 1/2-lb. Balls. 15 1/2 to 17 1/2¢	
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No. 36, 1/4 and 1/2-lb. Balls. 15 to 17¢	
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Chalk Line, Cotton 14-lb. Balls. 24 to 29¢	
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Cotton Mops, 6, 9, 12 and 15 lb. to doz. 8 1/2 to 19¢	
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Cotton Wrapping, 5 Balls to lb. according to quality. 13 1/2 to 19¢	
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American 3-Ply Hemp, 1-lb. Balls. 19 1/2 to 18¢	
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American 3-Ply Hemp, 1-lb. Balls. 19 1/2 to 18¢	
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India, 3-Ply Hemp, 1-lb. Balls. 19 1/2 to 18¢	
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Balls (Spring Twine). 17 1/2 to 9¢	
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India 3-Ply Hemp, 1-lb. Balls. 7 1/2 to 9¢	
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India 3-Ply Hemp, 1-lb. Balls. 7 1/2 to 9¢	
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2, 3, 4 and 5-Ply Jute, 1 1/2-lb. Balls. 9 to 11¢	
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Mason Line, Linen, 1/2-lb. Balls. 47¢	
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No. 26 1/2 Mattress, 1/4 and 1/2 lb. Balls, according to quality. 30 to 60¢	
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Wool, 5 to 6 ply. B 6¢; A 7 1/2¢	
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Vises—

Solid Box. 50&50 to 50&10&5%	
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Parallel—

Atchaf Machine Co.: Simpson's Adjustable. 40%	
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Standard. 40%	
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Amateur. 25%	
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Columbian Edw. Co. 40&5%	
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Slide. 65%	
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Fisher & Norris Double Screw, net each. Nos. 2, \$10.00; 3, \$16.00; 4, \$20.00; 5, \$27.00; 6, \$32.00.	
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Fulton Mach. & Vise Co.: F. & R. Double Swivel Machinists'. 40%	
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Star, Solid Jaw, Machinists'. 40%	
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Holland's: Machinists'. 40&40&5%	
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Keystone. 65&65&70%	
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Lewis Tool Co.: Adjustable Jaw. 30%	
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Monarch, 50%; Solid Jaw. 50%	
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Massey Vise Co.:—

Clincher. 40%	
Parallel Bar. 15%	
Perfect, 15%; Lightning Grip. 15%	
Merrill's. 15%	
Millers Falls Oral Slide Pattern. 50&10%	

Parker's—

Victor. 20&25%; Regulars. 20&25%	
Vulcan's. 40&45%	
Combination Pipe. 55&60%	
Prentiss. 20&25%	
Rock Island. 35%	
Svedliker & X. L. 33 1/2%	
Stephens'. 33 1/2%	

Saw Filers

Diaston's D 3 Clamp and Guide. 1/2 doz., \$24.00, 30%; Clamps. 30%	
Perfection Saw Clamps, 1/2 doz. \$4.50	
Reading. 60%	

Wood Workers—

Fulton Mach. & Vise Co.: F. & R. Double Swivel Coachman's. 40%	
Star Solid Jaw Woodworkers'. 60%	
Massey Vise Co.: Lightning Grip, 15%; Perfect. 15%	

Wyman & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.	
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Miscellaneous—

Fulton Machine & Vise Co., Combination Pipe. 60&60&5%	
Holland's Combination Pipe. 60&60&5%	
Massey's Quick Action Pipe. 40%	
Parker's Combination Pipe: 87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.	
Rock Island Pipe. 25%	

Wads—Price per M.

B. E., 11 up. 60¢	
B. E., 9 and 10. 70¢	
B. E., 8. 80¢	
B. E., 7. 80¢	
B. E., 11 up. \$1.00	
P. E., 9 and 10. 1.25	
P. E., 8. 1.50	
P. E., 7. 1.50	

Ely's B. E., 11 and larger. \$1.70 to \$1.75	
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Ely's P. E., 12 to 20. \$3.00 to \$3.25	
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Ware, Hollow—

Cast Iron, Hollow—	
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Store Hollow Ware:	
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Enameled. 45¢ to 10%	
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Ground. 50¢ to 5%	
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Plain or Unground. 60%	
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Country Hollow Ware, per 100 lbs. \$2.75 to \$3.00	
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White Enameled Ware:	
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Maslin Kettles. 65¢ to 10%	
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Covered Ware:	
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Tinned and Turned. 35¢ to 10%	
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Enameled. 45¢ to 10%	
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See also Pots, Glue.	
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Enameled—

Agate Nickel Steel Ware. 33 1/2%	
El-an-ge. 60&10%	
Iron Clad Ware. 70&10%	
Lava and Volcanic, Enameled. 40&10%	

Tea Kettles—

Galvanized Tea Kettles:	
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Inch. 6 7 8 9	
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Each. 45¢ 50¢ 55¢ 65¢	
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Steel Hollow Ware—

Avery Stamping Co.: Never-Break Spiders and Grids. 65&10%	
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Steel Kettles,

